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Noise-Induced Hearing Loss: A Descriptive Study of Grade 6 Children's Knowledge, Intentions and Opinions

by

Melanie Jan Petrushko

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The undersigned certify that they have read, and recommend to the Faculty of Graduate Studies and Research for acceptance, a thesis entitled "Noise-Induced Hearing Loss: A Descriptive Study of Grade 6 Children's Knowledge, Intentions and Opinions" submitted by Melanie Jan Petrushko in partial fulfillment of the requirements for the degree of Master of Science in Speech-Language Pathology.

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DEDICATION

For my husband Perry, my partner through thick and thin-- for support above and beyond the call of duty; for never complaining about the charred or non-existent meals and general chaos; for opening doors for me and believing in chivalry; for never asking what exactly I was doing anyway; for teaching me not to worry; for watching Boo-Boo lots and lots; for technical support, advice, and patience; for breaks when I really needed them; and especially for loving me - just because;

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For my parents, Wayne and Carole Brososky, who sacrificed much so I could have more-- for teaching me that where you are going is more important than where you've been, that satisfaction comes from a job well done, that wealth has nothing to do with money, and that there is more to learning than formal education; for proving that they couldn't love me more no matter what; and for praying me through life;

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And especially for the Author of I Corinthians 13:2 --

"And though I understand all mysteries,
and possess all knowledge;
...and have not (God's) love, I am nothing."

ABSTRACT

This study is a descriptive study of the knowledge, intentions and opinions of 24 grade 6 children regarding hearing conservation. All subjects completed a written questionnaire designed to assess hearing conservation knowledge, intentions and opinions, and then watched a video entitled "I Love What I Hear." Twenty-three of the subjects also participated in pre- and post-video focus group interviews. The resulting data were analyzed descriptively.

Questionnaire knowledge answers resulted in a mean group knowledge score of 49.79%, and 77.08% of the students wanted to learn how to use a sound level meter. Answers to opinion items on the questionnaire revealed that while most students felt their parents knew how to protect their hearing, only 1/3 felt their siblings knew how.

In comparing questionnaire with pre-video interview knowledge answers, suggested places and activities that could damage hearing as well as warning signs of NIHL were identified well on both the questionnaire and during the pre-video interview; however, students described NIHL and hearing protection more accurately on the questionnaire. Both questionnaire and pre-video interview opinion answers suggested that most students believed their household members were exposed to hazardous noise and that their parents knew enough about how to protect their hearing. During the pre-video interview all students stated that

their siblings did not know enough about how to protect their hearing, although on the questionnaire about 1/3 felt they did. Most students had no prior exposure to a hearing conservation program (HCP).

Change in knowledge answers (pre- versus post-video interview answers) included better descriptions of hearing protection as well as increased identification of places and activities that could cause a hearing loss. Following the video, all students said they planned to protect their hearing. About half expressed this intention before the video. Opinions that changed following the video included more students feeling that their fathers were exposed to dangerous noise levels at work, and more felt their parents were adequately protecting their hearing. The area of hearing protection became more important to the students, and they generated new ideas of what to include in a HCP (free handouts of earplugs and stickers, free hearing tests, a movie and a video game about NIHL). Results suggest that more comprehensive hearing conservation programs that involve students in the planning stages are needed.

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CHAPTER 1: INTRODUCTION

Effect of Noise On the Cochlea

Overexposure to hazardous levels of noise results in a hearing loss (Health and Welfare Canada, 1988). Experimental studies have documented the effects of overexposure to noise as primarily destroying the hair cells in the Organ of Corti (Kemp, 1935 cited in Melnick, 1978; Orloske & Leddo, 1981; Plakke, 1985; Roeser, 1980; Woodford & O'Farrell, 1983). The resulting hearing loss normally will appear first as a temporary threshold shift (TTS) (Orloske & Leddo, 1981), but longer periods of exposure may result in a permanent reduction in hearing (Frager, 1986; Health and Welfare Canada, 1988; Mills, 1971). Noise-induced hearing loss (NIHL) normally is gradually progressive, so a presently mild loss could become a debilitating loss in later years with continued exposure to noise (Lass, Woodford, Lundeen, English et al., 1990). Most research studying the effect of noise on hearing in humans has occurred in the workplace.

Occupational Hearing Loss

Effects of NIHL on Industrial Workers

Occupational hearing loss (OHL) has the potential to negatively affect workers in the workplace, the social arena, and home. (Hetu, Getty & Quoc, 1995; Hetu, Lalonde & Getty, 1987; Lewis, 1989)[1].

Workplace

Because of the invisible and often gradually-developing nature of OHL, workers with OHL may erroneously attribute the effects of their hearing loss to fatigue, lack of concentration, unclear articulation by speakers, and excessive background noise. Co-workers may erroneously attribute the same effects to an unwillingness of the worker with OHL to communicate. This possible lack of awareness of a NIHL compounds the following effects.

Problems perceiving auditory warning signals. Auditory warning signals are used in certain work environments for safety and communication (Hetu et al., 1995); however, a recent study (Hetu, 1994) showed that over one third of warning signals in a steel mill were not loud enough even for workers with normal hearing to detect and recognize them. Workers with some degree of OHL (approximately 40% of all workers) therefore would be even less able to hear the

---

[1] The vast majority of individuals with OHL have a gradually acquired loss. A few individuals in the studies have a sudden loss, e.g. from an explosion.

warning signals. This lack of awareness of the warning sound can place workers in handicapping situations regarding safety in the workplace.

Disabilities in localizing sound sources. In addition to being able to detect and recognize warning signals (e.g. horns, backup signals) in the workplace, workers must be able to localize the sounds in order to act upon them quickly and safely. When background noise is present, even workers with normal hearing tend to underestimate the distance of a sound source (McMurty & Mershon, 1985, in Hetu et el., 1995), and wearing hearing or head protection can further reduce one's ability to localize a sound source. It can be expected that workers with OHL are even less able to estimate a sound's distance or localize the source (Hetu et al., 1995). Workers with OHL experience difficulty localizing sounds in both quiet and noisy situations, thus placing their safety at risk, Hetu et al. (1995) report.

Disabilities in verbal communication. Workers with OHL experience difficulty communicating in the presence of background noise. Because of this, the industrial work setting (including the lunch room) places the worker with OHL at a communicative disadvantage much of the time (Hetu et al., 1995). The use of hearing protectors can further reduce the worker's ability to communicate effectively. Reduced verbal communication results in a need for repetition by speakers as well as the risk of not understanding a verbal warning in an emergency situation.

Social Activities

The loss of frequency resolution common in OHL results in reduced listening and communication skills in less than ideal listening situations (Getty & Hetu, 1995, in Hetu et al., 1995; Hetu et al., 1995; Hetu & Getty, 1991, in Hetu et al., 1995). According to these authors, disabling social situations can include everyday interactions (phone conversations, conversations in the car or on the bus), social gatherings (group conversations, meetings and parties, restaurants and social clubs), listening in large halls (theaters, movie theaters, concert halls, and churches), and using public services (banks and stores, government services, and health services). These disabling situations can lead to handicapping conditions such as social isolation, reduced autonomy, negative self-image, and a diminished quality of life (Hetu & Getty, 1991, in Hetu et al., 1995; Hetu et al., 1995).

Home

Expectations placed upon family members to adapt to the needs of the person with OHL can include increasing TV volume, repeating themselves, and answering the phone for the family member with OHL (Hetu et el., 1995). These expectations can lead to frustration amongst family members, and Hetu et al. (1995) state that the "reduced auditory capacities of the impaired person and the unacknowledged efforts of the partner lead to reduced interaction (p.506)".

Three types of communication breakdown can occur at home (Hetu et al., 1995): 1) misunderstandings (due to a failure of the person with OHL to answer,

inappropriate responses, and/or requests to have things repeated), 2) reduced frequency of interaction, and 3) narrowing the content of communication (restricting communication to more important matters because of the effort required). Hetu et al. (1995) summarize that "communication difficulties resulting from OHL affect everyday interactions, leading to devastating effects on family life and intimate relationships (p. 506)."

Prevention by Industrial Regulation

Since OHL has long been documented by overexposure to hazardous noise levels, strategies for the prevention of NIHL are legislated in industry. In industries across Canada, typical allowable legal limits of noise exposure for eight hours of steady exposure range from 85-90 decibels (dBA - without hearing protection), depending on the province (Health and Welfare Canada, 1988). The World Health Organization (WHO) proposes a more conservative safety limit of 75dBA for eight hours of exposure (Canadian Hearing Society, 1991). Typical noise regulations state that as the intensity level increases by 5 dB, the safe limit of time exposed to the sound is halved. In other words, one can listen to a 90 dBA sound for four hours, while a 95 dBA sound could become damaging after two hours (see Table 1).

TABLE 1: TYPICAL OCCUPATIONAL EXPOSURE LIMITS (WITHOUT HEARING PROTECTION)

Sound Level (dBA)	**Maximum Permitted Duration** (hours per day)
(figures to be prorated if not specified)	
80	16
85	8
90	4
95	2
100	1
105	1/2
110	1/4
115	1/8
> 115	0

Prevention by Industrial Hearing Conservation Programs (HCPs)

Effective HCPs including education of at-risk individual are required in order to reduce the prevalence of industrial NIHL (Cozad, Marston & Joseph, 1974; Flynn, 1983; Frager, 1986; Roeser, Coleman & Adams, 1983). A typical industrial HCP includes the following topics: a definition of noise, the anatomy of the ear, the physiology of hearing, how sound is measured, the effect of noise on hearing, psychosocial effects of NIHL (e.g. speech interference, annoyance, and inefficiency in the workplace), and ways to prevent NIHL including the use of ear protectors.

Non-Occupational Hearing Loss Due to Noise

Non-Occupational Noisy Environments

Loud noise can come from many different sources. Some sources of environmental noise include increased urbanization and transportation, more powerful machinery used for work and recreation, and a growing population (Jensen, 1978). Sources of loud noise exist in the community and include music (Catalano & Levin, 1985; Danenberg, Loos-Cosgrove & LoVerde, 1987; Fearn & Hanson, 1989; Hellstrom & Axelsson, 1988; Lee, Senders, Gantz & Otto, 1985; Orloske & Leddo, 1981; West & Evans, 1990), sports such as snowmobiling and shooting (Bess & Powell, 1972; Bess & Poynor, 1972; Fearn & Hanson, 1989), and ambient noise in community facilities including children's wards and neonatal nurseries (Keipert, 1985) and day care centers (Truchon-Gagnon & Hetu, 1988). Homes are also a source of loud noise from items such as some appliances, chain saws, lawnmowers, vacuum cleaners, blenders, and drills (Health and Welfare Canada, 1988). The Canadian Hearing Society (1991) states that at a distance of three feet, the sound level of a food blender is 63-87dB, workshop tools are 62-96dB, a vacuum cleaner is 63-88dB, leaf blowers are up to 112dB, chain saws can be up to 116dB, and early model cordless phones have rings that have been measured at 140dB. Several toys including squeaky toys, cap guns, sirens (Axelsson & Jerson, 1985; Gupta & Vishwakarma, 1989) and remote control airplanes (Bess & Powell, 1972; Pearlman & Miller, 1985) may also be harmful,

as can personal cassette players (Catalano & Levin, 1985; Hellstrom & Axelsson, 1988; Lee et al., 1985).

Non-Industrial Policies

Jensen (1978) suggests that society is socially and technologically advanced enough to start enjoying our progress quietly, and in an effort to promote this, some countries have begun implementing noise abatement policies to reduce environmental noise (Noise and Hearing Loss, 1991). National and local policies have included noise limits on swimming pools, restaurants and bars; restrictions on when noisy items can be used; labeling items to promote use of lower-noise residential equipment; improving sound insulation; and educating the public to increase their awareness of hazardous noise and its effects (Noise and Hearing Loss, 1991).

Media Attention Towards Hearing Conservation

There seems to have been an increase in media attention towards NIHL and hearing conservation in the past few years. This public information consists of warnings about the dangers of NIHL and hearing conservation strategies to prevent such hearing loss. Recent public articles include *Stop making so much noise!* (Kent, 1996), *Loudness alert falling on deaf ears* (Sherrington, 1996), *Listen to loud music and you can Kiss your hearing goodbye* (Staples, 1996), *Cut noise or be fined, clubs told* (Arnold & Staples, 1992), *The curse of the bewitched ear* (Christmas, 1992), *Anti-noise crusader has heard enough*

(Hodgkinson, 1992), *Turn down that racket!* (Jaret, 1992), *Do you hear what I hear?* (Leyland, 1992), *Too loud?* (Troiano, 1992), *Music loud and proud: It's almost enough to make you go deaf* (Arnold & Staples, 1991), *Environmental noise hazard takes heavy toll* (Gooderham, 1991), *City muffles concerts in Hawrelak Park* (Kohut, 1991), *Hidden hazards of chronic noise* (Lang, 1991), and *Now hear this - if you can* (Toufexis, 1991). In addition an International Noise Awareness Day has been instituted as of April 26, 1996 in two dozen countries (Kent, 1996). There are also various public information brochures and packets offered by nonprofit organizations such as provincial health units and the Canadian Hearing Society at no charge. In spite of this potential public awareness, there continues to be hearing loss due to overexposure of noise in all age groups in society (Frager, 1986; Lass et al., 1990; Lewis, 1989). Because of this availability of information, it is important to monitor needs of the public regarding hearing conservation.

CHAPTER 2: REVIEW OF THE LITERATURE

NIHL In Children

Incidence

Children and youths are reportedly overexposed to hazardous noise thus putting their hearing at risk (Axelsson, Aniansson & Costa, 1987; Axelsson & Jerson, 1985; Brookhouser, Worthington, & Kelly, 1992; Chermak & Peters-McCarthy, 1991; Cozad et al., 1974; Danenberg et al., 1987; Frager, 1986; Lankford & West, 1993; Lass et al., 1990; Lass, Woodford, Lundeen, Lundeen & Everly-Myers, 1987; Lass, Woodford, Lundeen, Lundeen & Everly-Myers, 1986; Lewis, 1989; Montgomery & Fujikawa, 1992; Oyiborhoro, 1986, p. 421; Plakke, 1991, 1985; Woodford, 1985).

Some authors have reported that the incidence of NIHL increases with age. Montgomery and Fujikawa (1992) tested the hearing of 1500 children in grades two, eight, and twelve, and found a significantly higher prevalence of NIHL in the older children. They also note that there was a greater prevalence of NIHL in second and eighth grade children in 1992 than in 1982. Looking at 2500 school children ages 7 to 13, Axelsson et al. (1987) defined "hearing loss" as having a greater than 20dB threshold at one or more frequencies. The incidence of hearing loss reported (Axelsson et al., 1987) for boys at 7, 10, and 13 years was 13.7%, 15.7%, and 15.6%, respectively. The corresponding incidences for girls were 11.7%, 12.1%, and 9.0%. Axelsson, Jerson, Lindberg & Lindgren (1981) also

reported the incidence of NIHL for 16-17 year old boys as 15%, higher than in girls. This gender difference was suggested to be due to noisier leisure time activities of boys.

Effects of NIHL In Children

Impaired hearing can lead to reduced speech and communication skills, which in turn could have negative effects on a child's or youth's safety, education and/or social development (Oyiborhoro, 1986). Reduced ability to hear can result in an inability to estimate a sound's distance as well as detect and localize sound sources such as warning signals. Even a mild NIHL can be a significant handicap in the classroom because children require greater signal-noise ratios than adults to hear the same sound (Mills & Lilly, 1971). Because of this, a NIHL in school children could have more impact than in an adult.

Activities and Items Of Risk For Children And Youth

Many leisure time activities and devices used by children and youths such as dances, rock concerts, car or motorcycle racing events, hairdryers, all-terrain vehicles, motorcycles, personal cassette players, firecrackers, firearms, lawn mowers, and chainsaws can reach dangerous noise levels over time (Axelsson & Jerson, 1985; Axelsson, Jerson, Lindberg et al., 1981; Axelsson, Jerson & Lindgren, 1981; Bess & Powell, 1972; Bess & Poynor, 1972; Brookhouser et al., 1992; Woodford & O'Farrell, 1983).

Students are exposed to dangerous noise levels in some school activities as well (Axelsson et al., 1987; Lankford & West, 1993; Roeser et al., 1983; Woodford & O'Farrell, 1983). Woodford and O'Farrell (1983) stated that

> *sound levels involved in many school-related activities are sufficient to provide a potential hazard to audition; a very small percentage of career transition programs in those schools surveyed furnish ear protection or are aware of sound levels in their shops, and students involved in high school level activities are more apt to have high-frequency hearing loss that those not involved in high school level activities. (p.27).*

Roeser et al. (1983) conducted a survey of noise levels in career transitions classes, and found that woodworking tools such as table saws, radial arm saws and routers were in excess of 100dBA when in use. Woodford (1981) found that continued exposure to noise in the shop classroom could cause high-frequency hearing loss in students. Woodford and O'Farrell (1983) felt that education and using personal hearing protection in school shops would "eliminate many problems and prevent much loss of hearing" (p.27). Lass et al. (1986) suggest that greater effort to prevent NIHL in students is needed.

HCPs for Children and Youths

Children and youths need effective ways to protect their hearing. Teaching children and youths about the dangers of noise pollution is one way to encourage them to protect their hearing from overexposure to noise (Oyiborhoro, 1986). The need for hearing conservation programs (HCPs) to begin in childhood has been reported in the literature since 1978 (Melnick, 1978). Florentine (1990)

suggests children should be exposed to HCPs before age twelve. This early education is expected to help prevent hearing loss due to recreational noise exposure during childhood as well as helping to prevent future occupational NIHL in adulthood. Plakke (1985) and Lass, Woodford, Lundeen, Lundeen and Everly-Myers (1987) recommend that hearing conservation should be a mandatory part of career and technology studies education.

Possible Contents For Hearing Conservation Programs

It has been suggested that effective school HCPs should focus on hearing health and normal development, the effect of noise on hearing, the awareness of sound sources and hearing protection (Chermak et al., 1996; Chermak & Peters-McCarthy, 1991; Lass et al., 1986; Lass, Woodford, Lundeen, Lundeen, Everly-Myers et al., 1987). Chermak et al. (1996) also recommend including hearing screenings, the use of a sound level meter, supplemental in-class teacher-led activities, and student participation during the HCP. Florentine (1990) advocates revising school texts to include more hearing health information that will motivate students to protect their hearing. She also suggests training more adults from the community to act as instructors in HCPs since they (adults) could then be used as role models for children. Frager and Kahn (1988) agree that school texts should place more emphasis on information about how to personally prevent the negative consequences of overexposure to noise.

Morrison's (1994) study involved a ten month follow up on grade seven students who had previously viewed the video "I Love What I Hear" (NIDCD - National Institute of Deafness and Communication Disorders, Clearinghouse Publishers) and received a NIHL inservice. An experimental group of 12 students who had seen the video was compared to a control group of thirty-seven grade seven students to see if the inservice had affected the students' knowledge, intentions, opinions and behaviour regarding NIHL and hearing conservation. There was no statistically significant difference between the two groups. Based on these results, Morrison (1994) made additional recommendations for the content of an educational HCP. They include:

- Information on the short and long term health consequences of NIHL
- Information on the short and long term social consequences of NIHL
- Two or more information sessions
- Discussion of social reasons for NOT protecting hearing
- Discussion of personal and public commitment to protect hearing
- Incorporation of social repertoires for resisting peer pressure
- Taking advantage of peer groups and prominent figures

Instructor Qualifications

Several authors note that educators themselves are not adequately informed as to the negative effects of overexposure to noise or how to reduce those effects (Chermak & Peters-McCarthy, 1991; Lass et al. 1985; Plakke, 1985; Woodford &

O'Farrell, 1983). Plakke (1991) found that although career and technology studies (CTS) teachers had been involved in HCPs, most were not employing safe hearing conservation practices. Plakke (1991) also reported that all instructors he interviewed taught about and required that safety glasses be worn in their laboratories at all times, but that hearing protection was discussed in less than half of the classes. Instructors did use hearing protection more often in 1991 than in 1985, but only required that students wear hearing protection around certain machines. Instructors did not understand that noise does not occur only around the loudest machines, but rather throughout the entire laboratory.

Effects of Educational Hearing Conservation Programs

School hearing conservation has become an area of concern since instructional methods in the classroom and social interactions tend to rely on the reception of auditory input. Despite the fact that the literature cites recommendations for increased hearing conservation content in school programs (Chermak, Curtis & Seikel, 1996; Chermak & Peters-McCarthy, 1991; Cozad et al., 1974; Frager, 1986; Frager & Kahn, 1988; Gittins, 1986; Gupta & Vishwakarma, 1989; Lees, Roberts & Wald, 1985; Orloske & Leddo, 1981; Plakke, 1985; Plakke, 1991; Roeser et al., 1983), recent surveys of some school health education programs show that controlled measurement of the effects of a formal educational HCP is lacking (Chermak et al., 1996; Chermak & Peters-McCarthy, 1991; Frager & Kahn, 1988; Lass et al., 1985; Lass et al., 1990;

Plakke, 1985; Roeser et al., 1983). Although five educational HCPs have been reported (Chermak et al., 1996; Chermak & Peters-McCarthy, 1991; Lass, et al., 1986; Lass, Woodford, Lundeen, Lundeen, Everly-Myers et al., 1987b; Lewis, 1989), there is evidence only that these educational HCPs for school-aged children have been effective in increasing positive health intentions and the awareness of the harmful effects of noise on hearing for up to one month. The programs were developed to increase the awareness and knowledge of NIHL and hearing conservation in elementary, junior high and high school students. Each of the school HCPs plus one needs assessment is outlined below, followed by a discussion of strengths and limitations.

Study 1: Lass, Woodford, Lundeen, Lundeen and Everly-Myers, 1987[1]

Needs Assessment (survey):

Lass, Woodford, Lundeen, Lundeen & Everly-Myers (1987) assessed the knowledge of hearing, hearing loss and hearing health in high school students in order to design a future educational HCP (see Study 3: Lass et al., 1986) targeting the lacking areas. A questionnaire about the normal hearing mechanism, the causes of hearing loss, self-exposure levels and the effect of noise on hearing was administered to 101 high school students between 15 and 18 years old.

[1] Although published at a later date (1987), this study was conducted before the Lass et al., 1986 study and will therefore be discussed first. The HCP component of this study is presented in Lass et al., 1986.

Of the students surveyed, 90.1% said they knew that excess exposure to loud noise could cause a permanent hearing loss, but 48.5% falsely believed that the same hearing loss could usually be corrected by medical treatment. In terms of exposure to noise, 10% of those surveyed reported a hearing loss, 73.3% used a portable stereo with headphones, 96% listened to a stereo system, and 41% listened to that stereo system with headphones. Students reported attending dances (37.8%), rock concerts (35%), and car or motorcycle racing events (27.3%). Noisy equipment used included lawn mowers (36.3%), firearms (19.3%), and chain saws (14.4%).

The majority (90.1%) of the respondents said they knew repeated and prolonged exposure to loud noise could cause permanent hearing loss and 87.1% knew that most NIHL is preventable. Of all the respondents, 38.6% did not know that damage to hearing depends on both loudness and exposure time, and 35.6% thought that a hearing aid brought damaged hearing back to normal, in the same way that eyeglasses bring damaged vision back to normal. 94.1% knew that exposure to loud noise could cause ringing in the ears (tinnitus), 85.1% knew that NIHL affected more than just the low frequencies, and 89.1% knew that the statement "People should not wear ear protectors (like earplugs or earmuffs) when using noisy equipment or machines because they won't be able to hear others talking to them" was false. While it is encouraging that students were aware of some aspects of hearing, damage to hearing, and hearing protection, they

demonstrated a lack of awareness of some of the damaging effects of noise such as its potentially mild and/or permanent nature. Of particular importance is the fact that knowledge does not predict behvaviours since 84.2% of the students stated that they never wore earplugs to protect their hearing, even though the same percentage (84.2%) knew that hearing protectors are used in some noisy environments to prevent NIHL.

Study 2: Lass, Woodford, Lundeen, Lundeen, Everly-Myers et al., 1987

Needs assessment (survey) and HCP:

A hearing conservation program was designed by Lass, Woodford, Lundeen, Lundeen, Everly-Myers et al. (1987) and implemented in a junior high school. The authors wanted to see if "information provided in a classroom setting would alter knowledge, attitudes and behaviour of students regarding hearing conservation" (p.32). A pre-hearing conservation program (pre-HCP) questionnaire, including questions about the normal hearing mechanism, causes of hearing loss, effects of noise on hearing, personal exposure to environmental noise, and personal use of hearing protection was administered to 236 junior high science students between the ages of 11 and 15 years. Students then participated in a formal educational HCP consisting of a film, "Ears and Hearing," a lecture on hearing and hearing loss, and a fact sheet handout called "Facts on Noise and Hearing." The film was shown during one class, with the lecture following in a later class. The program included information on the normal hearing mechanism,

the causes of hearing loss, and the effects of noise on hearing, and the lecture specifically targeted the following topics: anatomy and physiology of the normal hearing system, types and causes of hearing losses, the effect of noise on hearing, warning signs of NIHL, and recommendations for preventing NIHL. Students were allowed to ask questions throughout the lecture. A post-HCP questionnaire was given one month after the educational program and was similar to the pre-HCP questionnaire with extra questions on future plans to wear hearing protection in various noisy situations. The following summarized results indicate that the program was at least partially successful.

Exposure to Noise - *Pre-Participation*: Out of all respondents, 5.5% of respondents stated that they had a hearing loss, 69.5% reported using a portable stereo with headphones, 93.6% said that they listened to a stereo system, and 41.6% stated that they listened to the stereo system with headphones. Dances were attended by 84.7% of the students, 53% attended rock concerts, and 17% attended car or motorcycle racing events. Most frequently-used noisy equipment included lawn mowers (60.2%), firearms (24.2%), and chain saws (14%). Most respondents (86.4%) said they never wore earplugs to protect their hearing.

Exposure to Noise - *Post-Participation*: Following the HCP, 33.4% of the students said that they would use earplugs for hearing protection when operating noisy equipment, and 14.9% said that they would use earplugs at various social/recreational functions such as dances and rock concerts. Most

(59.6%) of students reported their intention to reduce the volume on their walkmans and stereo systems to prevent damaging their hearing, and 68% planned to rest their ears at rock concerts and dances by briefly going into a noise-free area during those events.

Knowledge of Hearing and Hearing Loss - *Pre-participation*: Before attending the HCP, 88.1% of respondents knew that repeated or prolonged exposure to damaging levels of noise can cause a permanent hearing loss, 88.1% knew that most NIHL can be prevented, and 94.5% knew that exposure to loud noise can cause ringing in the ears (tinnitus), while 45.8% did not know that some drugs used to treat diseases could cause permanent hearing loss, and 27.5% falsely believed that a hearing aid can restore damaged hearing back to normal like eyeglasses restore vision. Most of the students (83.5%) knew that hearing protectors are used in some noisy environments to prevent NIHL and 89.4% knew that the statement "People should not wear ear protectors (like earplugs or earmuffs) when using noisy equipment or machines, because they won't be able to hear others talking to them" was false. Some students (25.4%) were unaware that damage to hearing depends on both the loudness and duration of the noise, and 36.9% wrongly believed that NIHL could usually be corrected by medical treatment.

Knowledge of Hearing and Hearing Loss - *Post-participation*: After the HCP most respondents (96.4%) knew that exposure to loud noise could cause

tinnitus, 76.8% knew that most NIHL could be prevented, and 83.9% knew that it was a sign that a noise was too loud it they could not hear someone talking less than two feet away. The majority of students (91.7%) now knew that the extent of NIHL depended on both the loudness and duration of the noise, and 60.1% of the students knew that NIHL could not be corrected by medical treatment.

Most students (73.8%) said that the program was helpful to them and, in general, most evidenced a better understanding of the effects of exposure to noise and planned to wear hearing protection in dangerously noisy situations. The authors concluded that these results are indicative of a successful HCP, which should ultimately reduce the prevalence of NIHL in this population.

Study 3: Lass, Woodford, Lundeen, Lundeen and Everly-Myers, 1986

Needs assessment (survey) and HCP:

This is a follow-up study to Study 1 (Lass, Woodford, Lundeen, Lundeen, & Everly-Myers, 1987). Lass et al. (1986) conducted this study using the same 71 students to assess the effects of a school educational program on altering the knowledge and attitudes of high school students regarding hearing conservation. A pre-HCP measure of attitudes was not obtained, but five such items were included in the post-HCP questionnaire. The attitudinal items inquired as to students' future plans to use hearing protection at social/recreational events and when operating noisy equipment. Seven informational items were administered pre- and post-HCP to assess knowledge, and were the same items that Lass,

Woodford, Lundeen, Lundeen, & Everly-Myers (1987) and Lass, Woodford, Lundeen, Lundeen, Everly-Myers et al. (1987) had administered to junior high students. The HCP was administered to six high school health classes and consisted of a film, "Ears and Hearing," a lecture on hearing and hearing loss, and an informational handout called "Facts on Noise and Hearing." The topics covered were the same as those found in the Lass, Woodford, Lundeen, Lundeen, Everly-Myers et al. (1987) HCP.

Exposure to Noise - *Post-participation*: After completing the HCP, 30.7% of respondents stated that they planned to use hearing protection when using noisy equipment, while 14.1% planned to protect their hearing at social/recreational events (range = 1.5% for dances to 23.2% for motorcycle racing events). Most students (60.6%) intended to reduce the volume on their walkmans and stereos to prevent hearing loss, and 70.4% said they would rest their ears in a noise-free area during rock concerts and/or dances. Of the students completing the HCP and post-HCP questionnaire, 78.9% felt that the HCP was helpful to them.

Knowledge of Hearing and Hearing Loss - *Post-participation*: Almost all (98.6%) of the students now knew that exposure to loud noise could cause ringing in the ears (tinnitus), 84.5% knew that most NIHL could be prevented, 90.1% knew that if you could not hear someone talking less than two feet away, the noise in their environment was too loud, and the same percentage (90.1%)

knew that damage to hearing depended on both the level (intensity) of the noise as well as the duration of exposure. After attending the HCP, 71.8% knew that NIHL could not be corrected by medical treatment, and 45% knew that the units used to measure the loudness of a sound were called decibels or watts. Overall there was a 16.7% increase in correct knowledge answers following the HCP. The authors concluded that the students showed a better understanding of the effects of noise on hearing than they had before the HCP, but warned that what students say they plan to do to protect their hearing may not be what they actually do.

Study 4: Lewis, 1989

Needs assessment (survey) and HCP:

Lewis (1989) designed a study to ascertain whether or not an educational HCP would affect the attitudes, behaviors, and knowledge of high school students regarding hearing and hearing conservation. A pre-participation questionnaire was administered, immediately followed by a HCP, and a post-participation questionnaire was administered one week after the HCP. The questions asked, pre- and post-HCP, were adapted from the questions used by Lass, Woodford, Lundeen, Lundeen, Everly-Myers et al. (1987), although the HCP itself varied somewhat.

The pre-participation questionnaire included questions about the hearing mechanism, the causes of hearing loss, effects of noise on hearing, and effects of

noise on communicative abilities. Also included were questions on personal exposure to noise, use of noisy equipment, use of hearing protection, attendance at loud social/recreational events, and identification of professionals in the field. The topic of the educational HCP included concepts of noise levels and decibels, effects of noise exposure, hearing aids, and hearing loss, and the anatomy and physiology of the hearing mechanism. Topics addressed were similar to those of Lass et al. (1986) and Lass, Woodford, Lundeen, Lundeen, Everly-Myers et al. (1987), but an amateur musician who played in jazz and rock bands administered the HCP and discussed what it was like to be regularly exposed to loud noise during performances. The post-participation questionnaire included questions about the respondents' knowledge of hearing loss and the effects of noise on hearing, as well as future plans for using hearing protection in noisy situations.

Exposure to Noise - *Pre-Participation results:* The majority (72.2%) of students used a personal stereo with headphones, 96.14% listened to the stereo frequently, and 47.2% listened to a stereo with headphones. Most commonly attended social/recreational events included dances (71.22%), rock concerts (43,69%), and tractor pulls (26.95%). Of the 1137 students who completed all three phases of the study, 84.96% of them stated on the pre-HCP questionnaire that they never wore hearing protection, even though 89.47% of the students knew that overexposure to loud noise could lead to permanent hearing loss and 89.86% knew that these losses were preventable.

Exposure to Noise - *Post-participation results*: Some (16.95%) of the respondents planned to use hearing protection when using various kinds of noisy equipment in the future, 21.79% planned to wear ear protectors at various social/recreational events, 56.9% planned to reduce the volume of their stereos and walkmans to prevent damaging their hearing, and 58.22% planned to rest their ears in a noise-free area during rock concerts and/or dances. Most of the students (79.77%) believed that the educational HCP they attended was helpful to them. Lewis (1989) was unsure as to whether or not "student attitudes toward hearing conservation altered enough to effect major behavioural changes concerning the amount of noise exposure they routinely allow in their lives" (p.24).

Knowledge of Hearing and Hearing Loss - *Post-participation results*: Post-HCP questionnaire results concurred with those in the Lass, Woodford, Lundeen, Lundeen, Everly-Myers et al. (1987) study, in that the majority of respondents planned to wear hearing protection or rest their hearing in dangerously noisy environments. The students' answers also showed a significant increase in the knowledge of the effects of overexposure to noise.

Study 5: Chermak & Peters-McCarthy, 1991

Needs assessment (survey) and HCP:

A HCP was presented by Chermak and Peters-McCarthy (1991) to 45 normal hearing third and fourth grade students in regular education programs.

Elementary students were selected because of the importance of the early development of good health habits. As in previous studies (Lass et al., 1986; Lass, Woodford, Lundeen, Lundeen & Everly-Myers, 1987; Lass, Woodford, Lundeen, Lundeen, Everly-Myers et al., 1987; Lewis, 1989), questionnaires were administered pre- and post-HCP to assess the students' knowledge of hearing, NIHL, and hearing conservation practices. The questions were chosen from the ones used by Lass et al. (1986), Lass, Woodford, Lundeen, Lundeen and Everly-Myers (1987), and Lass, Woodford, Lundeen, Lundeen, Everly-Myers et al. (1987). The HCP consisted of a lecture, film, hearing screening demonstration, question-and-answer and discovery learning periods, and the distribution of earplugs and a handout.

Knowledge about noise and NIHL increased by an average of 23% following the HCP, and 96.7% of the children intended to use hearing protection when involved in noisy activities. The authors suggested that follow-up studies are needed to see if HCPs are effective in establishing long-term hearing health habits.

Study 6: Chermak, Curtis and Seikel, 1996

Needs assessment (survey) and HCP:

Chermak, Curtis and Siekel (1996) presented an educational HCP to 48 fourth-grade children enrolled in two regular education classrooms. The HCP emphasized student participation and teacher-led supplemental in-class activities.

The students filled out questionnaires assessing their knowledge of hearing, NIHL, and hearing conservation practices before and after the HCP. The HCP was constructed of hands-on activities, as well as presentations, a videotape, hearing screening demonstrations, question and answer times, discovery learning periods, and distribution of earplugs and a pamphlet. Pamphlets were sent home for the students to show their parents, and students assembled models of the ear and measured sounds with a sound level meter in class. Supplemental HCP activities were also provided for the teachers to use in their classrooms. Students were used as "teachers," and were given opportunities to act as facilitators.

Knowledge scores increased after the HCP by 24%, while understanding of appropriate hearing conservation practices increased by 59%. These increases were substantial, and greater increases were seen in the group whose teacher led more supplemental class activities. After the HCP, a large majority (77%) of the students intended to use hearing protection when involved in noisy activities.

Summary of HCPs

All above-mentioned studies reported an increase in students' knowledge about NIHL and the intention to protect their hearing from noise in the future.

Limitations. The above six studies addressed the need for protection against the effects of noise on hearing in children and youths and they attempted to rectify this with HCPs. The 5 HCPs themselves appear to be comprehensive, but some limitations in methodology exist.

Content. As can be seen in Table 2 on page 29, much of the recommended content for HCPs was not included in the five HCPs discussed (Chermak et al., 1996; Chermak & Peters-McCarthy, 1991; Lass, et al. 1986; Lass, Woodford, Lundeen, Lundeen, Everly-Myers et al., 1987; Lewis, 1989). All of the studies included the topics of hearing health and normal development, the effects of noise on hearing, awareness of sound sources, hearing protection, and information on the short and long term consequences of NIHL. Two of the five HCPs (Lass, Woodford, Lundeen, Lundeen, Everly-Myers et al., 1987; Chermak et al., 1996) used two or more information sessions, and one study (Lewis, 1989) used an amateur musician as a role model in the HCP. Chermak et al. (1996) and Chermak & Peters-McCarthy (1991) also incorporated student participation and hearing screenings. Only one HCP (Chermak et al., 1996) incorporated the use of peer groups and supplemental in-class activities. None of the studies addressed the short and long term social consequences of NIHL, social reasons not to protect hearing, the importance of personal and public commitment to protect hearing, or the incorporation of social routines for resisting peer pressure.

TABLE 2: INCLUSION OF RECOMMENDED CONTENT IN FIVE HCPS

Recommended Content	Lass, Woodford, Lundeen, Lundeen, Everly-Myers et al., 1987 (Study 2)	Lass et al., 1986 (Study 3)	Lewis, 1989 (Study 4)	Chermak & Peters-McCarthy, 1991 (Study 5)	Chermak et al., 1996 (Study 6)
Hearing health and normal development	*	*	*	*	*
Effects of noise on hearing	*	*	*	*	*
Awareness of sound sources	*	*	*	*	*
Hearing protection	*	*	*	*	*
Using adults as role models			*		
Short and long term health consequences of NIHL	*	*	*	*	*
Short and long term social consequences of NIHL					
Two or more information sessions	*				*
Discussion of social reasons to not protect hearing					
Discussion of personal and public commitment to protect hearing					
Incorporation of social routines for resisting peer pressure					
Taking advantage of peer groups and prominent figures					*
Hearing screenings				*	*
Use of a sound level meter					*
Student participation during the HCP				*	*
Supplemental in-class (teacher-led) activities					*
Use of a health promotion framework					

Long Term Effects. None of the studies measured the effects of an HCP beyond one month. Morrison's (1994) study measured the effects of an HCP ten months after it was administered and found no significant effects between the group of 12 students who had participated and a control group. More long-term

follow-up studies will be important in order to accurately determine the benefits of HCPs in the future.

Questionnaire format. One suggested limitation of some these studies involves the questionnaire items/response foils themselves. It is possible that a significant number of the students stated that they planned to wear hearing protection when warranted since the alternative, according to some test instruments (Chermak & Peters-McCarthy, 1991; Lass et al., 1986; Lass, Woodford, Lundeen, Lundeen & Everly-Myers, 1987; Lass, Woodford, Lundeen, Lundeen, Everly-Myers et al., 1987; Lewis, 1989), was to "damage" their hearing. Since no alternative such as in a scale (e.g. always, sometimes, never) was given in some of the questionnaires, it is possible that a significant number of students said they would protect their hearing in order to avoid an irresponsible-looking choice such as not protecting and thus "damaging" their hearing. It may have been more effective to have unbiased questions, with equal respect given to both "yes" and "no" answers. Open-ended questions/interviews were not used in any of the studies.

Perhaps actual "intentions" were not measured at all, but rather the students' desire to please the examiner and choose the "correct" answer. Chermak and Peters-McCarthy (1991) admit that this may have been the case, but even more questionable is the choice of questions in their 1991 study, especially for the third and fourth grade students. The questions were taken from the Lass et al. (1986)

study which targeted high school students. Reading level, relevance, and content were not reported to be adjusted.

Promotion of Hearing Health

Stapleton and Royster (1985) suggest that it is important to alter employees' attitudes about hearing conservation in order to achieve a more effective HCP, and that people are controllable only to the extent that they believe that the final goal (in this case, hearing health) has some value. Because of this, it is important to unearth the opinions and attitudes of students regarding the prevention of NIHL, and, consequently, the promotion of optimal hearing. Once this is accomplished, educational HCPs will be best able to target the areas in which students need to change.

Health promotion is broader in scope than prevention and it is concerned with enhancing the individual's well-being (Goodstadt, Simpson & Loranger, 1987). Health promotion is the science and art of helping people change their lifestyles to move toward a state of optimal health (ASHA, 1991). Ugland (1989) suggests that we need to present relevant facts, openly discuss health values, and heighten awareness of the interrelation between physical and mental health in order to enhance commitment to the promotion of optimal health. It is essential to realize that health is a value; therefore, techniques aimed at changing preventive health behavior inevitably involves values. Stapleton & Royster (1985) claim that people will change their health habits only if they believe the final goal has some

value, so it will be important in this study to attempt to determine the attitudes of students toward the prevention of NIHL and, consequently, the promotion of optimal hearing.

Dixon, Crowe, Benner and Alston (1996) concluded that in order for a health promotion education program to be successful, intervention needs to begin early on, be well-planned and cumulative, and be incorporated into the school system from Kindergarten to Grade Twelve. They also note that the program should be led by an adult who is important to the children, should promote student participation, and should enlist parental and community support. None of the above-mentioned studies utilized a health promotion framework when developing their HCPs.

Rationale

A review of the literature suggests the content of published HCPs for school-aged children is lacking in five areas: 1) short and long-term consequences of NIHL, 2) discussion of social reasons to not protect hearing, 3) discussion of personal and public commitment to protect hearing, 4) incorporation of social routines for resisting peer pressure, and 5) use of a health promotion framework. This study was planned to attempt to improve upon the previous studies by providing a non-threatening medium (unbiased, open-ended interview questions) for students to convey their intentions and opinions regarding hearing health. It seemed that a descriptive design would best accomplish this goal, since open-

ended questions would allow the hearing health needs to be evidenced by the subjects rather than a forced-choice questionnaire alone in which the researcher must first postulate those needs. It is also hoped that the interview format would allow a more in-depth exploration of the feelings of subjects towards hearing health than a strictly quantitative paradigm would have. The interview style of data collection was be compared to the questionnaire format to determine which tool was more effective.

In this planned study upper elementary level students (grade 6) were chosen since it was felt by the researcher that this age group probably had not yet significantly damaged their hearing, but was beginning to engage in social situations that could be damaging. The video used ("I Love What I Hear") was designed for students in grades 3-6. Of these grades, grade 6 was felt to be the most appropriate since the students' reading skills would enable them to complete the questionnaire with relative ease.

Finally, published research in this area has not yet included Canadian data. This study is an attempt to begin collecting Canadian data in the area of educational hearing conservation.

Research Questions

The purpose of this study was to answer the following research questions:

1. What level of knowledge, intentions, and opinions does this sample of grade 6 students have about hearing as measured by a written questionnaire?

1a. What is the total overall knowledge level of the students regarding NIHL and hearing conservation practices as measured by answers to questionnaire items 1, 2, 3, 4, and 7 (Appendix A)?

1b. What are the intentions of the students regarding the use of a sound level meter as measured by answers to questionnaire item 6 (Appendix A)?

1c. What are the opinions of the students regarding NIHL and hearing conservation practices as measured by questionnaire items 8, 9, and 10 (Appendix A)?

2. What is the difference between HCP quantitative (questionnaire) versus descriptive (interview) data as measured by comparing questionnaire with pre-video interview answers?

3. Has this sample of grade 6 students previously been exposed in an educational setting to concepts about noise induced hearing loss and

hearing conservation practices as measured by pre-video interview item 1 (Appendix B)?

4. Does viewing the hearing conservation video "I Love What I Hear" (see **Materials**, p. 37) change the knowledge, intentions or opinions of this sample of grade 6 students as measured by in-person interviews?

4a. What is the change of knowledge level of the students regarding NIHL and hearing conservation practices as measured by a comparison of answers to pre-video interview items 2, 3, 4, 5, 6, and 7 (Appendix B) and post-video interview items 1, 2, 3, and 4 (Appendix C)?

4b. What is the change of the intentions of the students regarding NIHL and hearing conservation practices as shown in a comparison of answers to pre-video interview items 8, 10, 11, 12, 15, 16, 17, 18, 19, and 33 (Appendix B) and post-video interview items 5 and 7 (Appendix C)?

4c. What is the change of the opinions of the students regarding NIHL and hearing conservation practices as shown in a comparison of answers to pre-video interview items 9, 13, 14, 20,

21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, and 34 (Appendix B) and post-video interview items 6, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, and 25 (Appendix C)?

CHAPTER 3: METHODS

Subjects

Twenty-four 6th grade students (eight male, sixteen female) from two Edmonton area Christian schools completed a pre-video HCP questionnaire. Two schools rather than one were invited to participate since the respective population of each school was low. Thirteen students were from school one (focus groups one and two), and eleven students were from school two (focus group three). Twenty-three of the students (eight male, fifteen female) participated in the pre-and post-HCP video interviews.

Pilot Study

A pilot study was conducted with 8 students who were not attending the schools targeted for the present study. A questionnaire consisting of 35 multiple choice questions was used in the pilot study. Changes resulting from the pilot study include length of the questionnaire (shortened to 10 questions), format (some list format rather than just multiple choice), reduced reading complexity (shorter sentences and more common words), and the addition of questions used in other research studies in an interview format.

Materials

- Questionnaire (see Appendix A): The questionnaire was developed from HCPs for school aged children, as well as the pilot study described above.
- Video: *I love what I hear: That's why I'm an ear defender*. A videotape and teacher's guide for grades three through six. NIDCD Clearinghouse. P.O. Box 37777. Washington, DC 20013
- Interview Frameworks (see Appendices B & C): Developed from various HCPs' questionnaires, as well as a pilot study. Questions were chosen to reflect components of a recommended HCP.

Procedures

Two Edmonton area private schools were invited to participate in this study. One school was an elementary through senior high school located in the southeast urban district of Edmonton, and the other was an elementary through junior high school located in the west urban district of Edmonton. Upon the approval of the principals and grade 6 teachers, information and consent forms were sent home to each student in the grade 6 classrooms. Twenty-four grade 6 students in all agreed to participate. The following criteria for inclusion were met:

1. The students were assigned as usual to classes at the beginning of the year, not according to exceptional educational factors.

2. Students were of the same general academic level and ability, i.e. mainstreamed special-education students would have been included in the activities of the class, but excluded from data analyses.
3. Schools from which students were chosen used an Alberta government-approved curriculum.

Homeroom teachers attended an information session conducted by the researcher. This session included a background and rationale for the study, as well as instructions for the teachers to inform the researcher of students who did not meet the inclusion criteria, and a discussion of the importance of uniform presentation of the questionnaire to the students. A parent and subject information consent form was sent home with each child (see Appendix D) to be signed by both parent/guardian and student and returned to the homeroom teacher.

Once the consent forms were returned to the school, the teachers administered the questionnaires. The students who consented to participate in the study were instructed to write their first name and last initial.

Questionnaire. A forced-choice questionnaire was developed from a larger bank of questions used in a pilot study. This questionnaire, based on previously-reviewed HCPs, consisted of knowledge, behaviour, intention and opinion

questions and was administered by classroom teachers as a paper and pencil task (see Appendix A for questionnaire questions).

Interviews. All students completed the questionnaires one week before being interviewed. Students from school number one were initially interviewed (pre-video interview) one day, and viewed the video the next day (see Appendices B and C for interview frameworks). The second interview (post-video interview) was conducted immediately following the video. Students from school number two were interviewed (pre-video interview), immediately viewed the video, and were interviewed again (post-video interview) one hour later. These differences in timing were due to the different schedules in each of the schools.

Students were interviewed in three focus groups (two from school number one consisting of one group of 6 students and one group of 7 students, and one from school number two consisting of 10 students). Results could not always be quantified because of the nature of the group (e.g. one person may say something, while others nodded and therefore were not recorded, and some did not say anything), but numbers (e.g. two, some, most) will be mentioned when possible. It was hoped that interviewing them in groups encouraged the generation of new ideas, and that the discussion of various students acted as a springboard for other ideas not thought of by individuals. The interviews were audiotaped and orthographically transcribed word for word.

As was explained in the parent and subject information consent form, all students were invited to watch a video on hearing conservation entitled "I love what I hear: That's why I'm an Ear Defender" as a class. Students were not required to fill out the questionnaires to watch the video; however, all students who stayed to watch the video had completed the questionnaire.

Questionnaires were administered and interviews were completed during June, 1993.

CHAPTER 4: RESULTS

Descriptive Analysis of the Questionnaire

A descriptive analysis was completed to report the knowledge level, intentions and opinions of the subjects regarding NIHL and hearing conservation practices as shown by answers to the questionnaire items. Review of the answers revealed no major differences between the three interview focus groups, so they are discussed as one large group. Questionnaire results are summarized in Table 3 on page 46. The table reports both individual item results (percent correct, incorrect, and uncertain) and group mean scores for all subjects.

Research question number 1 asked what the total overall knowledge level, intentions and opinions of the students was regarding NIHL and hearing conservation practices as measured by answers to questionnaire items 1, 2, 3, 4, and 7 (Appendix A).

Knowledge

Research subquestion 1a asked what the total overall knowledge level of the students was regarding NIHL and hearing conservation practices as measured by answers to questionnaire items 1, 2, 3, 4, and 7 (Appendix A). Answers were measured by determining the percentage of correctly chosen options. For example, if a student correctly chose half of the activities that could cause a hearing loss (item 1), he or she was given a score of 50%. Overall group means for questionnaire items are discussed below.

Questionnaire item 1 asked which activities could cause a hearing loss. Individual scores on this item ranged from 0-100%, with a mean of 54.46% and a Standard Deviation (SD) of 28.71%. Most students knew that rock music, stereo headsets, motorcycling and hunting could be damaging to their hearing. The majority of students did not know that motor boats and water skiing, snowmobiling, or operating power tools could also be hazardous.

Questionnaire item 2 asked which people were exposed to hazardous noise at work. Individual scores on this item ranged from 27.78-77.78%, with a mean of 54.50% and a SD of 16.38%. Most students felt that military personnel, disc jockeys, construction workers, and factory workers were at risk, while erroneously believing that farmers, cab, truck and bus drivers, and computer operators were not at risk.

Questionnaire item 3 asked which statements described a hearing loss caused by noise. Individual scores on this item ranged from 33.33-100%, with a mean of 67.88% and a SD of 16.46%. Most students correctly believed that NIHL was not always painful, that at least part of the loss was temporary, and that a gradual and permanent loss could develop.

Questionnaire item 4 asked which activities and items could effectively protect hearing from hazardous noise ("if there is such a thing"). Individual scores on this item ranged from 25-100%, with a mean of 65.10% and a SD of 22.72%. Many knew that cotton in the ears was not adequate, while wearing safety

earplugs, limiting exposure time, and reducing the volume of a sound could effectively protect one's hearing.

Questionnaire item 7 asked about the warning signs of NIHL. Individual scores on this item ranged from 25-100%, with a mean of 78.13% and a SD of 19.43%. Most students knew that having to raise their voice to be heard 1/2 metre away, being unable to hear someone 1/2 metre away, pain/ringing in ears after they left a noisy area, and speech being muffled after leaving a noisy area were all warning signs of dangerously high noise levels.

Answers to questionnaire item 5 ("Have you ever used a sound level meter to measure the loudness of a noise?") revealed that 83% of students had never used a sound level meter.

Total hearing health care (mean knowledge) scores were derived from combining and averaging the answers to questions 1, 2, 3, 4, and 7. Scores ranged from 22% to 78%, with a mean of 49.79% and a Standard Deviation (SD) of 13.6%.

Intentions

Research subquestion 1b asked what the intentions of the students were regarding the use of a sound level meter. Students were given 100% for answering "yes," 50% for answering "uncertain," and 0% for answering "no." In response to questionnaire item 6 ("Would you like to know how to use a sound level meter?"), most students said they would like to know how to use one.

Scores on this item ranged from 0-100%, with a mean of 77.08% and a SD of 32.34%.

Opinions

Research subquestion 1c asked what the opinions of the students were regarding NIHL and hearing conservation practices. This was answered in questionnaire items 8, 9, and 10. All questionnaire item percentages ranged from 0-100%.

Questionnaire item 8 asked "Do you think you or other members of your household are ever exposed to noise that could cause either a temporary or permanent hearing loss?" Half of the students (50%) felt that they and household members were exposed to hazardous noise.

Questionnaire item 9 asked "Do you feel the adults in your household know how to protect their hearing from loud noise?" Most students (58%) believed that their parents knew how to protect their hearing.

Questionnaire item 10 asked "Do you feel the young people in your household know how to protect their hearing from loud noise?" Students were split on this answer. About one third (26%) felt they did, one third (37%) felt they did not, and one third (37%) were uncertain.

TABLE 3: QUESTIONNAIRE SUMMARY OF RESPONSES*

		Yes %	No %	U %	N =	G %
1. Do you think it is possible for a person to acquire a hearing loss from any of the following activities?	Hunting	54	25	21	24	
	Motor boat/water skiing	29	50	21	24	
	Snowmobiling	25	58	17	24	
	Motorcycling	50	46	4	24	
	Listening to rock music	71	17	13	24	
	Stereo headsets	67	17	17	24	
	Operating power tools	33	50	17	24	
	OVERALL GROUP MEAN					54
2. Do you think any of the following people might be exposed to hazardous noise levels at work?	Firefighters	42	33	25	24	
	Military personnel	58	21	21	24	
	Disc jockeys	67	25	8	24	
	Construction workers	87	9	4	23	
	Farmers	29	50	21	24	
	Career transitions teachers	17	42	42	24	
	Computer operators	13	71	17	24	
	Factory workers	57	22	22	23	
	Cab, truck, bus drivers	30	43	26	23	
	OVERALL GROUP MEAN					55
3. Do you think any of the following statements would describe a hearing loss caused by noise?	Loss is painful	21	58	21	24	
	Some part of loss is temporary	38	25	38	24	
	Gradual and permanent loss develops	79	4	17	24	
	OVERALL GROUP MEAN					68
4. Do you think any of the following actions could effectively protect hearing from hazardous noise (if there is such a thing)?	Cotton in ears	42	46	13	24	
	Wearing safety earplugs	67	17	17	24	
	Limiting exposure time	57	26	17	23	
	Reducing volume	79	14	7	24	
	OVERALL GROUP MEAN					65
5. Have you ever used a sound level meter to measure the loudness of a noise?		8	83	8	24	
6. Would you like to know how to measure the loudness of a sound?		71	8	21	24	
*** U = Uncertain, N = Number of Respondents, G% = Group Mean Percentage**						

...Table 3 continued on next page

TABLE 3: QUESTIONNAIRE SUMMARY OF RESPONSES, CONT'D...

7. Do you think any of the following situations might be used as warning signs that you may be in hazardous noise?	Have to raise voice to be heard 1/2 metre away	63	29	8	24	
	Can't hear someone 1/2 metre away	83	4	13	24	
	Speech around you is muffled after noise	67	17	13	23	
	Pain/ringing in ears after you leave noisy area	63	21	17	24	
	OVERALL GROUP MEAN					78
8. Do you think you or other members of your household are ever exposed to noise that could cause either a temporary or permanent hearing loss?		50	29	21	24	
9. Do you feel the adults in your household know how to protect their hearing from loud noise?		58	11	32	19	
10. Do you feel the young people in your household know how to protect their hearing from loud noise?		26	37	37	19	
* U = Uncertain, N = Number of Respondents, G% = Group Mean Percentage						

***Differences in "N" (e.g. 19, 23, or 24) are due to number of students answering each question. Items 9 and 10 were only answered by students who answered "yes" to Item 8. Columns 1-3 report the item analysis for the group of respondents. Column 4 reports the number of respondents. Column 5 reports the overall group mean.**

Comparison of Questionnaire and Pre-Video Interview Answers

Research question number 2 asked what the respective difference between quantitative (questionnaire) and descriptive (interview) data was. This was measured by descriptively comparing answers to seven questionnaire items with answers to four matching knowledge and three matching opinion interview items.

Knowledge Item Answers

When asked what places or activities could cause NIHL on the questionnaire (questionnaire item 1), most students did not know that motor boats and water-skiing, snowmobiling, or power tools could cause a NIHL. Most students did know that rock music, stereo headsets, motorcycling and hunting could cause a NIHL. In pre-video interview item 3 students added correct

answers: rock concerts, airplanes, factories, personal stereos, construction sites, as well as the incorrect answer of putting clay in their ears.

When asked to describe NIHL (questionnaire item 3, pre-video interview item 2), answers on the questionnaire revealed that the majority of students knew that NIHL was not always painful, part of the loss was temporary, and both a gradual and permanent loss could develop. Answers to the same question on the pre-video interview incorrectly referred to ears exploding and breaking.

When asked what could protect hearing in noisy situations (questionnaire item 4, pre-video interview item 5) on the questionnaire, many students knew that cotton in the ears was inadequate, while using earplugs, limiting exposure time, and reducing sound volume could protect one's hearing. Answers to the same question in the pre-video interview incorrectly included using earphones or a helmet, being noisy enough to block out the noise, and telling a policeman.

Warning signs of NIHL (questionnaire item 7, pre-video interview item 7) were usually correctly chosen on the questionnaire as having to raise their voice to or being unable to hear someone 1/2 metre away, pain and ringing in the ears upon leaving a noisy situation, and speech sounding muffled after leaving a noisy situation. In the pre-video interview, most students answered the same question by saying that being unable to hear themselves, speech sounding like they were under water, and pain and ringing in the ears were all warning signs. Although students gave extreme answers (bleeding, unable to hear anything) at times, this

question was answered quite well on the questionnaire and during the pre-video interview.

Opinion Item Answers

Students were asked if they felt any members of their household were exposed to damaging levels of noise (questionnaire item 8, pre-video interview item 20). On the questionnaire about half of the students said members of their household were exposed to excessive noise, but during the pre-video interview all students said members of their household were exposed to dangerous noise levels. The question "Do the adults in your household know enough about protecting their hearing from noise?" (questionnaire item 9, pre-video interview item 21) resulted in most students saying "yes" on the questionnaire and the pre-video. When asked on the questionnaire if the young people in their households knew enough about how to protect their hearing (questionnaire item 10), about 1/3 felt their siblings did. When the same question was asked in the pre-video interview (item 22), all students agreed their siblings did not know enough.

Previous Exposure to HCPs

Research question number 3 asked whether or not this group of grade 6 students had previously been exposed to concepts about NIHL and hearing conservation practices. This was answered in pre-video interview item 1. Most students had little prior instruction in NIHL or how to protect their hearing from noise. One student's father worked in a noisy setting and explained the

importance of earplugs to his family, and one class had heard a former teacher discuss the dangers of loud noise; however, the students could not remember any strategies mentioned for protecting their hearing other than using earplugs.

Descriptive Analysis of the Pre- and Post-Video Interviews

A descriptive analysis was completed to report the students' prior exposure to HCPs, knowledge level, intentions and opinions of the students regarding NIHL and hearing conservation practices as indicated by answers to the pre- and post-video interview questions. Transcript summaries for all interview data appear in table form in Appendices F and G.

Research question 4 asked if viewing the hearing conservation video "I Love What I Hear" changed the components of a recommended HCP held by this sample of grade 6 students as measured by in-person interviews. This was targeted by research subquestions 4a, 4b and 4c.

Knowledge

Research subquestion 4a asked "What is the change of knowledge level of the students regarding NIHL and hearing conservation practices as measured by a comparison of answers to pre-video interview items 2, 3, 4, 5, 6, and 7 and post-video interview items 1, 2, 3, and 4?"

Pre-video Knowledge Responses

Pre-video interview item 2 asked what the students thought a hearing loss from noise meant. Some students said it is when "sound is so loud that it goes in

your ear and explodes," and it is "too much for your ears too take and your ears go BANG!" Most answers referred to sound being painfully loud, loud enough to vibrate, hurt, explode and "shatter" the eardrum. There was a general incorrect belief that NIHL involved a very noticeable and usually painful loss of hearing. Some students also felt that putting small objects in the ear could cause hearing loss.

Pre-video interview item 3 asked what places or activities the students thought could be damaging to their hearing. Standard answers included rock concerts, airplanes, trucks, factories, loud tape recorders, Stanley Cup games, West Edmonton Mall, construction sites, and power plants.

Pre-video interview item 4 asked who should have to worry about protecting their hearing from excessive noise. Most students incorrectly believed that only people working in factories, "old people," babies, and rock and roll musicians were at risk. Some students correctly believed that "all people" including themselves were at risk and should take measures to protect their hearing from excessive noise.

Pre-video interview item 5 asked how the students thought they could protect their hearing in noisy situations. Answers incorrectly included earphones, motorcycle helmets, being louder than the noise itself, and earmuffs. Some correct answers included asking someone to turn down the volume or using earplugs.

Pre-video interview item 6 asked the students what they thought hearing protection looked like. Some students said "earplugs" while others mentioned vague devices such as "soft ones that you roll," "looks like a string" and "foam with a silver thing" as forms of hearing protection, as well as an incorrect answer of "a plastic ear that covers your ear." They were unaware of specific forms of hearing protection.

Pre-video interview item 7 asked the students for warning signs that they were in a situation with excessively loud noise. Answers included "Like under water when it sounds muffled," "Ringing in your ears," and pain. These answers did not touch on the fact that NIHL can be unnoticed for some time but rather focused on what it would be like to sustain a NIHL.

Summary of Pre-video Knowledge Responses

Students generally felt that NIHL meant total or severe deafness, and that it would be signaled by pain, explosions in the ear, and other obvious signs. They were unaware of the subtle nature of NIHL, which is often not noticed for a long time, and is usually not accompanied by pain. Students listed dangerously noisy places or activities as situations involving very high sound levels. They did not know that softer sounds, over longer time periods, can also be damaging. While a few students believed that all people were potentially at risk for developing NIHL, most students felt that only certain subgroups of people (older people, babies, and rock musicians) were at risk. Many students incorrectly believed that earphones,

helmets and earmuffs could protect their hearing. Some students did know that turning loud volumes down or using earplugs could help prevent NIHL. They did not know specifically what hearing protection looks like.

Post-video Knowledge Responses

Post-video interview item 1 asked what places or activities the students thought could be damaging to their hearing. Answers included rock concerts, boom boxes, "getting water in your ears," and loud noises. Boom boxes were mentioned frequently throughout the video. These post-video answers were less varied than pre-video responses.

Post-video interview item 2 asked what the students thought a hearing loss from noise meant. Students still incorrectly thought that it meant when "noise goes in the ears to those bones, and then they don't vibrate and you can't hear anything." They did remember that NIHL had something to do with the "bones" in the ear, but still were extreme in their opinion that NIHL ruins the bones, resulting in total deafness.

Post-video interview item 3 asked students how they could protect their hearing in noisy situations. Answers included wearing earplugs or other ear protection and turning loud music down.

Post-video interview item 4 asked for warning signs that a situation was too noisy. Answers fell into the categories of pain and bleeding of the ears,

pounding or ringing in the ears, and hearing loss ("everything's muffled; things are softer").

Summary of Post-video Knowledge Responses

Before seeing the video, students incorrectly believed that NIHL would result in their ears exploding and breaking. The students' ideas of NIHL did not change pre- and post-video, but rather continued to include only severe or total hearing loss rather than a possible mild loss. Following the video, students believed that NIHL meant that ears would be unable to vibrate, they themselves would be unable to "hear anything," and they continued to list extremely loud noises as possible sources of NIHL. They did not mention that quieter, everyday sounds could also cause NIHL over longer amounts of time. Pre-video suggestions of places or activities that could be damaging to hearing included rock concerts, airplanes, and factories, as well as incorrect answers such as putting clay in their ears. Following the video students listed rock concerts, water in the ears, and "boom boxes" as being potentially harmful to hearing. Answers to this question were more varied in the pre-video interview, but more accurate in the post-video interview (fewer incorrect answers). When asked how they could protect their hearing from NIHL, students gave more accurate answers following the video than before it. Pre-video answers had included "tell a policeman," using earphones or a helmet and "being noisy yourself" while post-video answers focused on wearing hearing protection and turning down excessively loud

volumes. Some warning signs suggested before the video included pain and ringing in the ears, being unable to hear themselves, and sounds being muffled as though they were under water. Following the video, students said warning signs could include being unable to hear, pain, bleeding, and ringing in the ears.

Intentions

Research subquestion 4b asked "What is the change of the intentions of the students regarding NIHL and hearing conservation practices as shown in a comparison of answers to pre-video interview items 8, 10, 11, 12, 15, 16, 17, 18, 19, and 33 and post-video interview items 5 and 7?"

Pre-video Intention Responses

Pre-video interview item 8 asked students if they would wear earplugs to protect their hearing. In general, the students agreed that would wear them if they thought the noise was truly at a damaging level and if other people wore them too. Students admitted that they didn't "wear earplugs because it's embarrassing," but that "neat colours" would help.

When asked if they would tell someone else to wear earplugs in damaging noise (Pre-video interview item 10), most said it would be too embarrassing, but they would discuss the issue with the other person. Others said that since it was "their (other person's) ears" they wouldn't care or say anything

Pre-video interview item 11 asked the students if they planned to do something to protect their hearing in the future. Many students said they did,

citing strategies such as turning their music down, wearing hearing protection if they worked in a factory, and just not exposing themselves to loud noise. One student insisted that it was important to protect hearing at a young age, because "if you don't protect your hearing when you are younger and then go deaf, it will affect your life." A couple of students said they did not plan to do anything to protect their hearing in the future.

Six intention questions were based on potential real-life events. In response to pre-video interview item 12 "If you were at a concert with some friends, and the music was loud enough to damage your hearing, would you do something to protect your hearing?", students' answers were divided. Many said no, and most who said yes included conditions such as only if the earplugs were very small. Those who said yes unconditionally planned to protect their hearing rather than "be deaf for the rest of their life."

Pre-video interview item 15 asked "You're sitting on a couch at your friend's house watching TV and playing cards. You have to shout to be heard above the TV. What would you do?" Most of the students agreed that they would either turn down the TV to watch it and quit playing cards, or turn the TV off and continue playing cards. They agreed it would not be embarrassing to do that.

Students were then asked "You're at a car race or a tractor pull with a friend and you have two pairs of earplugs. What would you do? (Pre-video

interview item 16)" Most students said they would wear a pair themselves, and many said they would also offer a pair to their friend. One student who frequents tractor pulls said he would just "hold my ear like this" (push in his tragus). There was general agreement that a tractor pull would be a good place to wear earplugs, but a rock concert was not, since then "you couldn't hear what was going on."

One group was asked what they would do if they were at a concert with two friends and had one pair of earplugs (Pre-video interview item 17). Answers included: put one plug in, give the other away and hold one ear shut; give the earplugs to the friend and hold both ears shut; and "just don't sit at the front" and then earplugs wouldn't be necessary.

Students offered a variety of answers to pre-video interview item 18: "You are somewhere with a loud band playing (e.g. a wedding, restaurant). What would you do?" Some said they would put in earplugs, some said they would give their ears a break or just leave, and others said they would cover their ears. One student said she would probably stay and listen to the music "because if I had earplugs or my finger in my ears, they'd (wedding couple, etc.) probably be very offended." One student said that if you use earplugs and can't hear the music "it's bogus."

Pre-video interview item 19 asked students if they had ever been in a noisy situation that could have damaged their hearing, what they did then, and what they would do now. All students said they had been in dangerously noisy

situations in the past. Some of the situations included playing in a band, siblings' stereos being too loud, rock concerts, and people popping lots of balloons nearby. What they did to protect their hearing included wearing earplugs, plugging their ears, asking people to turn their loud music down, stopping people from popping balloons, and leaving the noisy situation. While some students said that now they would start wearing earplugs, others insisted that even though they did not protect their hearing in the past they are fine today. "If something hurt my ears I would do something" was a common response.

Pre-video interview item 33 asked that if the students were teachers and two of their students lost some hearing due to noise, what would they tell their other students so it didn't happen again? This sample of grade 6 students said they would tell their students to wear earplugs to be on the safe side, turn walkmans down, do something if you get an earache, and step away from firecrackers. One student admitted he wouldn't give his class any advice "because I'd just be going on advice and I wouldn't do it either."

Summary of Pre-video Intention Responses

Before watching the video, some students felt that wearing earplugs would be embarrassing, but that they would wear them if the noise was really damaging (causing severe hearing loss) and if other people used earplugs too. Many students said they would not wear them if they were at a concert with friends, and those who said they would only if the earplugs were not noticeable; however,

students felt that it would be socially acceptable to wear hearing protection at a tractor pull. Some students believed that wearing earplugs at a concert would mean being unable to listen to the music. If turning down the volume in a noisy situation was an option, almost all students said they would do so and that it would not be embarrassing, unlike wearing hearing protection. Most students said they would not suggest using hearing protection to other people in noisy situations, but might discuss the issue in general. Many students said they did plan to protect their hearing in the future, especially in regards to music and employment (e.g. working in a factory). All students agreed that they had been exposed to dangerously high sound levels before. Hearing protection strategies at those times included wearing earplugs, plugging their ears, reducing the sound level, and leaving the situation. Most students said if they were telling students about NIHL, they would encourage them to use hearing protection and keep music volumes low.

Post-video Intention Responses

When asked "Do you plan to do anything to protect your hearing in noisy situations?" (post-video interview item 5), answers included yes, no "not in public" and restricting time spent in noisy situations. Before watching the video, students said they would protect their hearing if other people were, if earplugs came in neat colours, if they worked at a factory, and if they really thought the noise would damage their hearing (pre-video interview items 8 and 11).

Following the video some students said they would protect their hearing, but most included conditions similar to pre-video answers such as if the noise was really loud enough to damage their hearing. In general the students agreed that the video did not change their minds since it did not include enough information on how to prevent hearing loss. While one student felt that she knew "what to do," most agreed that they needed more information on the prevention of NIHL.

Post-video interview item 7 asked "What would you do if you were at a place with a really loud band?" In comparing pre-video item 18 with post-video item 7, answers changed significantly before and after the video. Before watching the video, about half of the students said they would protect their hearing by leaving a noisy situation or using hearing protection, while half said they would not. Following the video, all students agreed that they would either use hearing protection or leave/avoid dangerously noisy situations.

Summary of Post-video Intention Responses

Most students agreed that they still needed more information on preventing NIHL. Both before and after the video students said they would protect their hearing as long as the noise was really loud enough to damage hearing, and if it was socially acceptable. They did not feel that the video changed their minds in this area. When asked what they would do in a noisy case scenario (loud band playing) before the video, only about half said they would do

anything to protect their hearing. When asked after the video, all students said they would use hearing protection or leave the noisy situation.

Opinions

Research subquestion number 4c asked "What is the change of the opinions of the students regarding NIHL and hearing conservation practices as shown in a comparison of answers to pre-video interview items 9, 13, 14, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, and 34 and post-video interview items 6, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, and 25?"

Pre-video Opinion Responses

Pre-video interview item 9 asked students if they thought it was important to protect their hearing. All students except one felt that it was. They thought it was "very sad" to think about not hearing music or fire alarms, or having to "sit right up at the front" if you went to church.

Pre-video interview item 13 asked students what their friends would think if they were at a concert and put in earplugs. While a few of the students said their friends wouldn't care, most said they would "think I'm a total geek;" their friends would think they were "stupid," "boring," "weird," "mental," "dumb," and "geeky."

The students were then asked what they themselves would think if their friend put in earplugs at a concert (pre-video interview item 14). Again, most said they would think their friend was "a geek" and "mental," but several said they

would think it was smart: "I'd say they looked really dumb but wise; I'd feel kinda funny, but I'd also know that it was smart."

Pre-video interview item 20 asked the students if they thought anyone in their household was ever exposed to noise that could cause a hearing loss. Most said yes.

When asked if their parents knew enough about how to protect their hearing from noise (pre-video interview item 21), almost all said yes.

When asked if the young people in their household knew enough about how to protect their hearing from noise (pre-video interview item 22), almost all said no. "They do not know anything. They are so stupid. My brother does not know anything, so how could he know enough to protect his hearing?"

Pre-video interview item 23 asked the students if they thought their parents were adequately protecting their hearing from noise. About half said their parents were, while half said they were "definitely not."

Pre-video interview item 24 then asked the students if the young people in their households were adequately protecting their hearing from noise. All students agreed that while they themselves were doing okay, their siblings were not: "No way, no," "For sure not," "My sister does not care," and "My brother is so stupid."

Pre-video interview item 25 asked students why some students from the other schools said that things like snowmobiling, hunting and loud music couldn't

hurt their hearing. Some students from this sample said that they might just like loud music, they may not know enough about the issue, or they may have found that they didn't lose their hearing when in noisy situations.

When asked why some other students said certain household members did not adequately protect their hearing: "Why do you think they said that?" (pre-video interview item 26), students replied that maybe the family members didn't protect their hearing adequately, but maybe they just weren't exposed to loud noises either.

Pre-video interview item 27 asked "Do you care if you damage your hearing?" Three of the students said no, while the rest said yes.

When asked "What would it take to convince you to wear hearing protection?" (pre-video interview item 28), students gave a variety of answers such as believing that they would "never be able to hear anything," if a close friend lost their hearing, if a music star became deaf, or if you could die from it.

When asked what they would tell students in a HCP (pre-video interview item 29), students included ideas like using sound level meters (if they were only about $10.00 to buy), telling students they would go deaf if they didn't protect their hearing, emphasizing the fact that you may not get a second chance to protect hearing, taking the students out to listen to loud music followed by hearing tests, handing out earplugs to demonstrate what it would be like to have a mild loss, and telling stories of people who have lost some hearing.

This sample of students said they would use the same information for a group of adults, but would include more sophisticated vocabulary (pre-video interview item 30).

When asked how important it was to protect their hearing with all the other things to worry about (pre-video interview item 31), most of the students felt that it was equally and "very" important, but several felt it was less important than issues such as the rain forest, abortion, and "all the world's constitutional crises."

Students felt it was practical for the researcher to expect them to wear hearing protection (pre-video interview item 32).

When asked if there was anything else they had to say about NIHL, students felt there should be a law to wear earplugs if a sound is really loud, that earplugs should be handed out at the door of concerts, and that more stores should make them available to the public since most students had "never seen them in a store." They also reiterated the importance of using people who had actually suffered NIHL as examples in educational HCPs.

Summary of Pre-video Opinion Responses

Before watching the video, most students generally felt that protecting their hearing was as important as other major health issues, but some felt that global issues (rainforest, constitutional crises) were more important. They thought friends would think negatively of them if they wore earplugs at a concert.

Most said they would consider it odd (some said odd "but smart") if the friends wore earplugs at a concert. Most students felt that people in their households were exposed to damaging levels of noise, and that while parents knew how to protect their hearing, their siblings did not. Half of the students felt their parents were protecting their hearing adequately, while half said they were not. No one felt that siblings were adequately protecting their hearing. Some students felt that loud noises may not really be able to damage hearing since they and others they knew had been exposed to loud noises and didn't lose their hearing. This was reiterated when they replied they would be convinced to wear hearing protection if they, a friend, or a music star lost all their hearing. When asked what they would include in a HCP students included ideas such as using sound level meters, taking students out to listen to loud music before and after testing their hearing, and using people who had NIHL as examples. Students were concerned at the lack of availability of earplugs in the marketplace, adding that hearing protection should be easier to purchase.

Post-video Opinion Responses

When asked what they would think if other people wore earplugs at a concert (post-video interview item 6), most students said they would think the people were weird but smart. Some students said they might ask those people for some earplugs, and several students said that they felt the same as they did before the video. In comparing pre-video interview item 14 with post-video interview

item 6, there was no significant change in their opinions of someone who would wear earplugs at a concert. Most felt that it would be weird and looked dumb, but that it was really a smart and wise thing to do.

Students were also asked if they would want to be like the people at the concert who wore earplugs, i.e. "Would you want people to think you're weird but smart?" (post-video interview item 8). About half of the students said no, while half said yes.

Almost all students felt that people in their households were exposed to damaging levels of sound (post-video interview item 9), especially siblings and fathers (work related). All but one student felt that the adults in their household knew enough about how to protect their hearing (post-video interview item 10), but almost all felt that the young people (siblings, not themselves) in their households did not know enough (post-video interview item 11). These results were the same both before and after the video. One difference noted in the post-video was that more students felt their fathers were exposed to loud noise at work. Before the video, most students felt that neither parents nor siblings were adequately protecting their hearing from loud noises (pre-video interview items 23 and 24). Following the video (post-video interview item 12), students felt that while siblings were not adequately protecting their hearing, their parents were (post-video interview item 12).

When asked "Do you care if you damage your hearing?" before watching the video (pre-video interview item 27), almost all students said yes, because they did not want to be deaf and "you wouldn't hear anything." When asked the same question after the video (post-video interview item 13) even more students said yes, but several still felt that NIHL meant total deafness. A few said they would only care if they "actually" damaged their hearing.

Students' answers differed between pre- and post-video interviews when asked what it would take to convince them to use hearing protection (pre-video interview item 28 and post-video interview item 14). Before the video students listed bribes (money, food), threats (guns), believing that they would go completely deaf or die from NIHL, or seeing a friend go deaf as ways to convince them to wear hearing protection. Following the video several students said they wouldn't have to be convinced, they already believed that hearing protection was important. Some students still said they would have to be forced to wear hearing protection.

Pre-video interview item 29 and post-video interview item 15 asked the students what they would include in a HCP. New ideas following the video included a selection of free handouts (earplugs, eardrops, stickers), free eardrops and hearing tests, designing a more sophisticated video/movie including both real-life and cartoon characters, and creating a video game about combating NIHL.

Students were asked how important it was to protect hearing and what would be more important than hearing (pre-video interview item 31 and post-video interview item 16). Before the video, most of the students felt that it was very important, but several felt it was less important than large issues such as the rain forest, abortion, and "all the world's constitutional crises." Following the video, some students felt eyes were more important than ears, and that they would start protecting their hearing if it was already damaged a little bit. Several felt that protecting their hearing was more important to them after they watched the video.

Post-video interview item 17 asked the students what they thought about the video "I Love What I Hear." Most of the students felt that the video was weird, boring, corny, and/or juvenile, better suited to younger children or people who like rap music. One student liked the video.

When asked what they would and would not like to see in a new video (post-video interview items 18, 19, 24 and 25), students said they would like more illustrations of the ear, especially what gets hurt in NIHL, information on the consequences of NIHL, information on exactly what a decibel is, how many decibels different sounds are (e.g. airplane, conversation, et cetera), information on where to buy earplugs, a combination of real people and cartoon characters (like the movie "Roger Rabbit"), country or pop instead of rap music, and a new narrator/character, preferably a music star. The students also recommended

developing a fun, catchy commercial for TV, one with a 'This could happen to you' theme, for example "one like where everyone thought the old lady got hurt, but it was the young lady" or the Listerine commercial with the rooster gargling. They did not want to see a documentary-style video, did not like the name "boom box," and disliked the rapping character (an average-looking chubby junior high boy). They pointed out an inconsistency in the video that seemed to reduce the credibility of the narrator: "Yeah, if he's lecturing against boom boxes, how come in the beginning he's carrying one right against his ear?"

Post-video interview item 20 asked how people could be convinced that protecting their hearing is important. Students recommended exposing them to loud noise, putting warning signs on personal stereos, educating them about NIHL, and scaring them by giving them "temporary deafness."

In general, students felt the topic of NIHL was O.K., and some students even felt that it was interesting, but that the video was boring at times (post-video interview item 21).

The students felt that the discussions we had about NIHL were helpful to them, giving them information they needed to know about NIHL (post-video interview item 22).

Students were split in answering whether or not they would like to learn more about NIHL (post-video interview item 23). About half said yes, maybe, a little bit, and about half said no, not really. Those who said yes said they would

like to know what an audiologist is, what a decibel is, and what and how much noise can damage hearing.

Summary of Post-video Opinion Responses

Both before and after watching the video students felt that people who wore earplugs to concerts were "weird but smart." Following the video, more students felt that their fathers were exposed to loud noise than before the video, all but one felt that parents knew enough about hearing protection while siblings did not. Before the video students felt that their parents were not adequately protecting their hearing, but following the video they felt their parents were. Students felt that their siblings did not know enough about hearing protection and were not protecting their hearing, both before and after the video. Students said they cared about their hearing health, but based that on the opinion that NIHL meant total deafness. These opinions did not change following the video. Several students felt that hearing protection became more important to them after they watched the video, although some still felt that eye health was more important than hearing health. Several students said they wouldn't have to be convinced to use hearing protection after viewing the video, but some still said they would have to be forced to wear hearing protection. When asked what should be included in a HCP, the following ideas were suggested only after the students watched the video: free handouts of earplugs and stickers, free hearing tests, a high quality movie about NIHL, and creating a video game about battling NIHL.

CHAPTER 5: DISCUSSION

Questionnaire

Knowledge

Students' composite knowledge scores suggested that they correctly identified half (54.46%) of the listed potentially hazardous activities and half (54.50%) of the people potentially exposed to hazardous noise at work. Students generally knew what characterized NIHL (67.88% correct) and how they could protect their hearing (65.10% correct). Most students correctly listed warning signs of NIHL (78.13% correct). The overall group mean score was 64.01%. These scores suggest that students' knowledge strengths were in the areas of warning signs of NIHL, characteristics of NIHL, and how to protect their hearing from overexposure to noise. Potential weaknesses were noted in the areas of who is at risk for developing NIHL and what places or activities can harm hearing.

Intentions

Most students said that they would like to learn how to use a sound level meter (77.08%). This was the only "Intention" question included on the questionnaire, but it suggests that many of the students were interested in learning more about the subject of hearing conservation.

Opinions

In general, student answers to opinion items on the questionnaire suggested that they believed they and other family members (especially siblings) needed more information on hearing protection strategies. This opinion is a good start to developing healthy hearing habits since students are open to the possibility of learning more about NIHL and hearing conservation.

Questionnaire vs. Pre-video Interview

Knowledge

When asked what places or activities could cause NIHL as well as what were some warning signs of NIHL, pre-video interview answers seemed to be as varied as the questionnaire answers.

When asked to describe NIHL and give examples of hearing protection, students gave more complete answers on the questionnaire than during the pre-video interview. This could be because the questionnaire was in list format rather than open-ended like the interview, so the correct and incorrect answers were all listed. Seeing some of the correct answers may have triggered the students to recognize other less obvious ones, whereas during the interview no suggestions were offered even though students had recently read and answered the questionnaire. While some students did very well on the questionnaire items describing NIHL, evidence from their answers to interview questions suggests

that they really did not know what NIHL means. Interview answers may have given a more accurate picture of the student's level of knowledge.

Opinion

In response to the questionnaire, about half of the students said that their family members were exposed to dangerous levels of noise. When asked during the pre-video interview, all students felt family members were exposed. On both questionnaire and pre-video interview items, most students felt that the adults in their household knew enough about hearing protection. When asked on the questionnaire if their siblings knew enough about hearing protection, 1/3 of the students felt they did, but when asked the same question during the pre-video interview, none of the students felt their siblings knew enough about the subject.

From students' responses in this study it seems that knowledge items may have been answered better on the questionnaire; however, because interview knowledge items were answered less accurately, it would appear that the interview format provided a clearer picture of the students' knowledge level.

Differences Between the Questionnaire and Interview Format

Different strengths and weaknesses are associated with each of the methods of data collection (questionnaire versus focus group interviews) employed in this study. Some of the strengths and weaknesses of each as seen in this study are outlined in Table 4 on page 75. The questionnaire was teacher-administered, in-class, administered to the whole class at one time, and was a passive measure of

the students' knowledge, intentions, and opinions regarding hearing conservation. The interviews were administered by the researcher, out of class time, in another classroom, one small focus group at a time, and were both passive and active measures of the students' knowledge, intentions, and opinions regarding hearing conservation (e.g. some students were active participants, others were largely passive). It is possible that primarily vocal, uninformed students participated the most actively.

TABLE 4 : STRENGTHS AND WEAKNESSES OF QUESTIONNAIRE VS. INTERVIEWS (DATA COLLECTION)

	Questionnaire: Strengths	Questionnaire: Weaknesses	Interview: Strengths	Interview: Weaknesses
Time needed	Quick administration and analysis			Takes extra time to administer and analyze
Reliability	Easy to establish reliability			Difficult to establish reliability
Responses	Every student responds			Some students don't respond
Clarification		Students can't ask for clarification	Students can ask for clarification	
Analysis	Can perform quantitative statistical analyses			Can't perform quantitative statistical analyses
Group effect		Can't build on each other's ideas (e.g. springboarding)	Focus group allows students to build on each other's ideas/comments (e.g. springboarding)	
Setting	Administered in a comfortable, known setting			Unfamiliar setting and examiner; could cause embarrassment and shyness resulting in passivity
Peer pressure	No peer pressure (freedom to answer without outside influence)	No peer pressure: may not be an accurate measure of thoughts and opinions	Peer pressure: a more realistic setting, e g. similar to social events (group opinions play a part)	Peer pressure: students may be unwilling to reveal their true thoughts and opinions

Depending on the research question(s) asked in future studies, either the questionnaire or interview format could be used to advantage. For example, if looking at gender differences, a questionnaire format would be more likely to ensure reliability, and would enable the researcher to perform various quantitative statistical analyses. If attempting to assess the true opinions and intentions of students regarding hearing conservation, an interview format may allow for more springboarding of ideas, as well as give a more accurate picture of what students would feel in future situations when surrounded by their peers. More research to determine which data collection method is more effective for which research questions is needed.

Change (Pre-video Interview versus Post-Video Interview)

Knowledge

While students still only listed extremely loud noises as possible sources of NIHL and believed that NIHL meant severe or total deafness following the video, answers regarding hearing protection were more accurate, including using a variety of hearing protection as well as reducing loud volumes. Some NIHL warning signs suggested post-video were still typically incorrect and included pain and bleeding of the ears. It should be noted that some occupational explosions could result in cochlear ear damage evidenced by pain and bleeding, but this is not typically the case in NIHL.

Warning signs of NIHL were correctly chosen on the questionnaire. In both the pre- and post-video interviews, students answered the same question less accurately. This finding continues to support the suggestion that interview answers were more representative of the students' knowledge levels.

When asked what could cause NIHL, answers following the video were more concise and less varied, possibly because the video specifically emphasized rock concerts and "boom boxes."

As in previously-discussed HCPs (Lass, Woodford, Lundeen, Lundeen, Everly-Myers et al., 1987; Lass et al., 1986; Lewis, 1989; Chermak & Peters-

McCarthy, 1991; Chermak et al., 1996), overall knowledge scores increased following the HCP.

Intentions

When asked what they would do in a noisy situation (e.g. a loud band playing) before the video, only about half said they would do anything to protect their hearing. Students agreed after the video that they would protect their hearing by using hearing protection or leaving the situation as long as the noise was really loud enough to damage hearing severely, and if it was socially acceptable. Students were willing to protect their hearing in some social situations more than others. There was general agreement that a tractor pull would be a socially acceptable place to wear earplugs, but a rock concert was not a good place to wear hearing protection, since "then you couldn't hear what was going on."

Students felt that since the video did not include enough information on how to actually prevent hearing loss, it was not effective in changing their minds about protecting their hearing in the future; however, during post-video interviews all students said they would use hearing protection or leave noisy situations. Perhaps this increase in acceptable answers to "real-life situation" questions was due to the fact that the students could relate to situational examples more easily than general questions displaced from real-life situations. The students' perception that the video was ineffective is not necessarily in accordance

with their answers to intention questions. They seemed to be unaware that the video did in fact have an effect on their answers, if not their real-life intentions.

Opinions

Some students felt that loud noises may not really be able to damage hearing since they and others they knew had been exposed to loud noises and didn't lose their hearing. This seemed to make them doubt the gravity of NIHL even more. Students stated that they cared about their hearing health, but seemed to base that on the belief that NIHL meant total deafness. These opinions did not change following the video. They added that they would be convinced to wear hearing protection if someone had "actually" lost their hearing due to noise. This is consistent with what they would include in a HCP since they recommended using people with NIHL as examples to other students that it does in fact occur. The students seemed to be confused as to what it really meant to have NIHL and whether or not the effects of NIHL were significant enough for them to use hearing protection.

The video did not seem to convince the students of the importance of prevention rather than treatment of NIHL. Some students were already convinced to use hearing protection, while others said they needed more convincing than the video provided. In order to convince other people that protecting their hearing is important, the students recommended warning signs on personal stereos, and causing temporary hearing losses by exposing them to loud noise. When asked

what to tell other people, the students were quick to suggest copious amounts of prevention and hearing protection, but seemed less concerned about applying those ideas to themselves.

Certain aspects of NIHL may make it difficult to convince people of its serious implications. For example, it is not a visible consequence, hearing loss in general is often thought to be hereditary, and even a person affected by it may not know that he or she has such a loss. While consequences of habits such as smoking and not wearing seatbelts could be considered to be more obvious and life threatening, consequences of NIHL can be more subtle and difficult to attribute cause.

Most students now felt that people in their households were exposed to noise, that the adults were adequately protecting their hearing, and that their siblings were not. Most students said they cared if they damaged their hearing, with some stating that hearing protection became more important to them after watching the video. Prior to watching the video students felt that their parents were not adequately protecting their hearing, but following the video they felt their parents were. One difference noted in the post-video was that more students felt that their fathers were exposed to loud noise than before the video. This could be due to learning about various dangerously noisy working environments on the video.

Both before and after the video, students felt that their siblings did not know enough about hearing protection and were not protecting their hearing. Following the video, the students felt that they themselves knew how to and did protect their hearing adequately although responses to knowledge and intention items suggested that they actually did not. They may have felt they "knew" since they had seen an informational video on the subject. The video did not appear to provide enough information, but the students may have assumed that it did (i.e. why would someone show them an inadequate video?). It should be noted that even if the students and their family members know how to protect their hearing, that does not mean they are adequately protecting their hearing.

Students' Recommended HCP: Suggestions For Teachers

Despite the fact that the students were generally critical of the video, about half of the students said they would like to learn more about NIHL. Ideas for a better HCP and video included using a mascot; using sound level meters; free stickers, earplugs and hearing tests; more information on exactly what is damaged in NIHL; more information on the consequences of NIHL; learning about what an audiologist does; what a decibel is; exactly what amount of noise (and for how long) can damage hearing; designing a commercial for TV; and information on where to buy earplugs. They also suggested testing people's hearing before and after a loud concert, showing them the resulting hearing loss.

Students felt that hearing protection should be easier to purchase. None of them were able to recall seeing earplugs in stores, and expressed frustration with the video for not giving them information on where to purchase hearing protection. This is clearly an important issue to be covered in any HCP.

Students said they did not like the video, calling it "juvenile," "boring," and "corny." This was interesting since two teachers who also viewed the video thought it was excellent, and would be effective in reaching students. This fact suggests that it is indeed important to include students in the planning process of HCPs in order to meet their needs and maintain their interest.

The students wanted to replace the main character (narrator) with someone they admired, such as a current music or movie star, instead of an average boy their age. This is not surprising since much of our society focuses on ideal personalities rather than average people. The students seemed to want someone they could look up to, and were perhaps extra-critical of the narrator because they didn't admire or want to emulate him.

Additional suggestions for teachers gleaned from this and other studies include co-sharing the planning of the HCP with the students (e.g. asking the students what is important to them), using a socially current video and program, and making the subject as appealing as possible by including humor and high-profile actors.

General Conclusions

Interview answers seemed to be more representative of the students' knowledge levels than the questionnaire. Students felt that they still needed more specific information on what parts of the ear are damaged by NIHL, what levels of noise are damaging, and how to protect their hearing. They felt the area of hearing conservation became more important to them after viewing the video. Following the video, most students felt that their siblings were not adequately protecting their hearing from noise, but that their parents were. As in previously-discussed HCPs (Lass, Woodford, Lundeen, Lundeen, Everly-Myers et al., 1987; Lass et al., 1986; Lewis, 1989; Chermak & Peters-McCarthy, 1991; Chermak et al., 1996), students' overall knowledge scores increased after the HCP and more students intended to protect their hearing from noise in the future. Most of the students were very interested in helping design an educational HCP, and offered suggestions such as free hearing tests, handing out earplugs, and creating a video game about battling NIHL. Two teachers who saw the video commented that they thought it was effective and of good quality. The majority of the students disagreed with their teachers in their opinions of the value of the video. This supports the importance of student involvement in the planning stages of HCPs in order to maintain interest and be effective.

The importance of preventing NIHL is a difficult concept to convince students of. This could be due to the largely invisible and subtle nature of NIHL.

The person who has NIHL may not know it for a long time, and cause can be difficult to attribute.

Limitations of This Study

This study was not able to address the potential gender differences in students' knowledge level, intentions or opinions since the number of subjects was small, and equal numbers of male and female subjects were not used.

More time could have been used to collect data in the focus group interviews. Although the interview frameworks (questions) were completed, time limitations may have resulted in a) undue pressure on the interviewer and subjects to quickly move on to new questions, and b) a reduction in ideas that students may have had if they had been allowed more time to think and discuss amongst themselves.

More questions could have been matched (especially intention questions) in order to more effectively compare the differences in data collected from the questionnaire versus pre-video interviews. Since a post-video questionnaire was not administered, no comparisons could be made regarding the relative effectiveness of either instrument following a HCP.

Suggestions for Further Research

Studies designed to determine which data collection method (questionnaire versus interviews) is more effective are needed. In order to address this, studies could include pre- and post-questionnaires as well as pre- and post-interviews

matched for questions in various categories (e.g. knowledge, intentions and opinions). Matching questions in each category would allow for a more complete comparison than was completed in this study. By doing this, researchers will be able to design more efficient studies in the future. For example, it may be found that questionnaires are as effective as interviews in measuring students' perceived exposure to noise, but that opinions about hearing conservation should be addressed in an interview format.

The possibility of gender differences in each of the three categories addressed in this study (knowledge, intentions and opinions) could be explored. A large number of subjects as well as an equal number of male and female subjects would be required. In this case a questionnaire format would likely be the easiest to quantify, and may yield more reliable results than an interview format.

Based on suggestions for a recommended HCP collected from research studies and students' ideas, a study designed to determine the effectiveness of such a HCP would be of interest. As was mentioned in the literature review, these studies could be designed to assess the long-term effects (a year and longer) of HCPs. Of particular interest is whether or not actual behaviours of the students regarding hearing conservation change, and if this change is maintained over time.

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APPENDIX A: QUESTIONNAIRE

NOISE AND HEARING LOSS

Students receive a lot of health related tips from adults. This is an opportunity for students to share their opinions on one health issue: Noise and Hearing Loss. In this survey questionnaire, we want to learn what students have to say about the potential for a hearing loss to be caused by overexposure to loud noise. Please give your honest opinion of belief when you answer each question. Thank you for sharing your views.

PLEASE print your first name and last name initial here: _____ _____
(First Name) (Last Name Initial)

Example: Jamie Porter would print: Jamie P.

INSTRUCTIONS: Mark an "X" under YOUR ANSWER to each question. Please note that you may answer "yes", "no", or "uncertain" and the same answer may be used more than once for each question. Don't guess. If you have no opinion or no belief, please mark "uncertain".

EXAMPLE:

The following structures are found in the human ear:			Yes	No	Uncertain
a.	a snailshell formation called the eardrum	a.	___	___	___
b.	three small bones called the malleus, incus and stapes	b.	___	___	___
c.	nerve endings from the optic nerve	c.	___	___	___

QUESTIONNAIRE ITEMS:

1. Do you think it is possible for a person to acquire a hearing loss from any of the following activities?

1a.	hunting	1a.	___	___	___
1b.	motorboating/water-skiing	1b.	___	___	___
1c.	snowmobiling	1c.	___	___	___
1d.	motorcycling	1d.	___	___	___
1e.	listening to rock music	1e.	___	___	___
1f.	use of stereo	1f.	___	___	___
1g.	operation of power tools for home workshop and yard work	1g.	___	___	___

				Yes	No	Uncertain
2.	Do you think any of the following people might be exposed to hazardous noise levels at work?					
	2a.	some firefighters	2a.	___	___	___
	2b.	some military personnel	2b.	___	___	___
	2c.	some DJs (disc jockeys)	2c.	___	___	___
	2d.	some construction workers	2d.	___	___	___
	2e.	some farmers	2e.	___	___	___
	2f.	some shop (industrial arts) teachers	2f.	___	___	___
	2g.	some computer operators	2g.	___	___	___
	2h.	some factory workers	2h.	___	___	___
	2i.	some cab, truck, and bus drivers	2i.	___	___	___
3.	Do you think any of the following statements would describe a hearing loss caused by noise?					
	3a.	usually the hearing loss will be painful	3a.	___	___	___
	3b.	usually some part of the hearing loss will be temporary	3b.	___	___	___
	3c.	usually a gradual and permanent hearing loss will develop	3c.	___	___	___
4.	Do you think any of the following actions could effectively protect hearing from hazardous noise (if there is such a thing)?					
	4a.	putting cotton in your ears	4a.	___	___	___
	4b.	wearing safety earplugs	4b.	___	___	___
	4c.	limiting the time of exposure to loud noises	4c.	___	___	___
	4d.	reducing the volume of loud sounds	4d.	___	___	___
5.	Have you ever used a sound level meter to measure the loudness of a noise?		5.	___	___	___
6.	Would you like to know how to measure the loudness of a sound?		6.	___	___	___
7.	Do you think any of the following situations might be used as warning signs to indicate that you may be in hazardous noise?					
	7a.	you have to raise your voice to be heard by someone who is sitting 1/2 metre away from you	7a.	___	___	___
	7b.	you can't hear someone who is 1/2 metre away from you	7b.	___	___	___
	7c.	speech around you sounds muffled or dull <u>after</u> you leave the noisy area	7c.	___	___	___
	7d.	you have pain or ringing in your ears <u>after</u> you leave the noisy area	7d.	___	___	___

			Yes	No	Uncertain
8.	Do you think you or other members of your household are ever exposed to noise that could cause either a temporary or permanent hearing loss?	8.	____	____	____

IF YOU ANSWERED "NO" TO QUESTION 8. PLEASE STOP. DO NOT ANSWER ANY MORE QUESTIONS
IF YOU ANSWERED "YES" OR "UNCERTAIN" TO QUESTION 8 PLEASE CONTINUE ANSWERING QUESTIONS.

9.	Do you feel the adults in your household know how to protect their hearing from loud noise?	9.	____	____	____
10.	Do you feel the young people in your household know how to protect their hearing from loud noise?	10.	____	____	____

THANK YOU FOR SHARING YOUR BELIEFS AND OPINIONS WITH US

Melanie Petrushko, B.Sc. and Susan C. Haske, Ph.D.
Department of SPA, University of Alberta

APPENDIX B: Pre-Video Interview Framework (Questions) Numbered In Order of Appearance in the Interview

Knowledge Questions:

1. "Has anyone ever talked to you about hearing safety before?"
2. "What do you think a hearing loss from noise means?"
3. "What places or activities could damage your hearing?"
4. "Who do you think should worry about damaging their hearing?"
5. "How do you think you could protect your hearing in noisy situations?"
6. "What do you think hearing protection looks like?"
7. "What are some warning signs that you are in a noisy situation?"

Intention Questions:

8. "Would you wear earplugs to protect your hearing?"
10. "Would you tell someone else to wear earplugs if the noise was damaging?"
11. "Do you plan to do anything to protect your hearing in the future?"
12. "If you were at a concert with some friends, and the music was loud enough to damage your hearing, would you do something to protect your hearing?"
15. "You're sitting on a couch at your friend's house watching TV and playing cards. You have to shout to be heard above the TV. What would you do?"
16. "You're at a car race or a tractor pull with a friend and you have two pairs of earplugs. What would you do?"
17. "You're with two friends at a concert and you have one pair of earplugs. What would you do?"
18. "You are somewhere with a loud band playing (e.g. a wedding, a restaurant). What would you do?"
19. "Have you ever been in a noisy situation that could have damaged your hearing? If you were, what did you do then, and would you change what you did now?"
33. "Two boys lost their hearing ... If you were a teacher, what would you want to say to your students so that it didn't happen to them?"

Opinion Questions:

9. "Do you think it's important to protect your hearing?"
13. "You are at a concert and you put in earplugs. What would your friends think?"
14. "What would you think if your friend put in earplugs at the concert?"
20. "Do you think you or other people in your household are ever exposed to noise that could cause a hearing loss?"
21. "Do the adults in your household know enough about how to protect their hearing from noise?"
22. "Do the young people in your household know enough about how to protect their hearing?"
23. "Do you think the adults in your household are adequately protecting their hearing from noise?"
24. "Do you think the young people in your household are adequately protecting their hearing from noise?"
25. "Some students from the other schools said in the questionnaire that things like snowmobiling, hunting and loud music couldn't hurt their hearing. Why do you think they said that?"
26. "Some students said in the questionnaire that some members of their household didn't adequately protect their hearing. Why do you think they said that?"
27. "Do you care if you damage your hearing?"
28. "What would it take to convince you to wear hearing protection?"
29. "The vice principal of your school has asked me to get a committee together to develop a program for your school about hearing protection. You are my committee. What do you think is important to tell the students?"
30. "Would you tell adults anything different than the students?"
31. "In 1993, today, with all the other things to worry about in the world, how important is it for you to protect your hearing?"
32. "With all the other things to worry about in the world today, is it practical for me to expect young people to protect their hearing?"
34. "Is there anything else you'd like to say about this topic?"

APPENDIX C: Post-Video Interview Framework (Questions) Numbered In Order of Appearance in the Interview

Knowledge Questions:

1. "What places and/or activities do you think could be damaging to your hearing?"
2. "What do you think a hearing loss from noise means?"
3. "How could you protect your hearing in noisy situations?"
4. "What are some warning signs that you are in a place that is too noisy?"

Intention Questions:

5. "Do you plan to do anything to protect your hearing in noisy situations?"
7. "What would you do if you were at a place with a really loud band?"

Opinion Questions:

6. "What would you think if other people put in earplugs at a concert?"
8. "Would you want to be like (people who put in earplugs at concerts)? Would you want people to think you're weird but smart?"
9. "Do you think people in your household are ever exposed to noise that could cause a hearing loss?"
10. "Do the adults in your household know enough about how to protect their hearing from noise?"
11. "Do the young people in your household know enough about how to protect their hearing from noise?"
12. "Do you think the people in your household are adequately protecting their hearing from noise?"
13. "Do you care if you damage your hearing?"
14. "What would it take to convince you to wear hearing protection?"
15. "The vice principal of your school has asked me to get a committee together to develop a program for your school about hearing protection. You are my committee. What do you think is important to tell the students/include in the program?"
16. "In 1993, today, with all the other things to worry about in the world, how important is it for you to protect your hearing? ___ is more important than my ears right now."
17. "What did you think about the video?"
18. "If people are making a new video now, what would you like to see?"
19. "What DON'T you want in the new video?"
20. "How do I convince people that it is important to protect their hearing?"
21. "In general, how do you feel about this topic?"
22. "Were these discussions helpful to you?"
23. "Do you want to learn more about this topic?"
24. "What information should have been included?"
25. "Misc. Suggestions"

APPENDIX D: COVER LETTER

Are you or your family at risk for noise-induced hearing loss?
Can personal cassette players be hazardous to children's ears?
Is noise-induced hearing loss permanent or temporary?
Do you have a hearing loss?

YOUR CHILDREN ARE INVITED TO LEARN THE FACTS
AT A VIDEO PRESENTATION ENTITLED

"I love what I hear: That's why I'm an Ear Defender."

Name and address of school

Date

Dear Parents/Guardians,

_____ School is cooperating with the University of Alberta to acquire data on the knowledge and opinions of Grade Six students on the possible relationship between overexposure to loud noise and hearing loss. At this time we are asking for your permission to have your son or daughter participate in this research project.

During June, participating students will be asked to complete a short (15 minute) questionnaire administered by their classroom teacher. Selected students will then be interviewed by a University of Alberta graduate student during two free periods. All Grade Six students are invited to view a film entitled: "I love what I hear."

Please read the attached information sheet. If you are willing to have your son or daughter participate in the project, please sign the research consent form at the bottom of the information sheet and return one copy to your child's Grade Six teacher. Thank-you for your attention to this matter.

APPENDIX E: PROJECT INFORMATION AND CONSENT FORM

Project Title: Noise and Hearing Loss

Project Researcher: Melanie Petrushko, B.Sc.
Department of Speech Pathology and Audiology, University of Alberta
Telephone: 492-5990; 450-6722 (res.)

Supervisor: Susan C. Haske, Ph.D.

Purpose:

The purpose of this study is to determine what children in grade six know about the causes and prevention of noise-induced hearing loss (NIHL), and their opinions about the subject.

Procedure:

Consent forms have been sent home from school with each student in grade six. Students and parents are asked to read these forms and sign them if they are willing to participate. Consenting students will complete a 15-25 minute questionnaire on hearing safety administered by their teacher in a spare class period. In addition, selected students will be invited to participate in a tape-recorded, group interview which will take one spare class period. At a later date, participating students will watch a ten-minute video presentation entitled "I Love What I Hear." Once students watch the video, the researcher will return to conduct a second group interview (also about one spare class period) with previously-interviewed students.

Risks:

This research poses no known risks for participants. All data will be used for research purposes only and will be kept confidential. Only the researcher will have a master list of all participants.

Participation Benefits:

There will be no immediate, direct benefit to the participants as a result of participating; however, it is expected that the information from this study will impact the effectiveness of future educational hearing conservation programs. Students in grade six will have the opportunity to watch an informational video on hearing conservation which may increase their awareness of noise-induced hearing loss and their ability to protect their hearing from damaging noises.

Thank-you for your consideration of this information. If you agree to participate, please sign this consent form and keep one copy for your records.

Consent Form:

I, _____ (student) agree to participate in the above research project directed by Melanie Petrushko of the University of Alberta. I have been adequately informed about the purpose and procedures of this research and the extent of my participation. I understand that my responses will be kept confidential, that there is no risk involved and that I may withdraw from the project at any time without consequence. I understand that questions and concerns can be directed to Melanie Petrushko at 492-5990 or 450-6722 (res.) or her Supervisor Dr. Susan Haske at the University of Alberta at 492-0834. I have received a copy of this document.

_____	_____	
Participant's (Student's) Printed Name	Parent's/Guardian's Printed Name	
_____	_____	_____
Participant's (Student's) Signature	Parent's/Guardian's Signature	Date
_____	_____	
Researcher (for interview consent)	Date	

APPENDIX F: PRE-VIDEO INTERVIEW TRANSCRIPT SUMMARIES

TABLE 5

	Meadowlark - Group 1 answers	*Meadowlark - Group 2 answers*	*Millwoods - Group 3 answers*
KNOWLEDGE *Number 1* **(Pre)** **"Has anyone ever talked to you about hearing safety before?"**	No. No. No. Yes. My Dad.	No. No.	No. No. Mom. Mrs. Toews. They told us at the factory that we could lose hearing, so we had to get this earplug stuff (wax) so we could protect. She said if you didn't protect your hearing you could lose it. Eardrums will break. - shatter - if exposed to too much sound.
KNOWLEDGE *Number 2* **(Pre)** **"What do you think a hearing loss from noise means?"**	Loud sounds. Objects poked into ears. Sound goes in and hurts that place inside. Sound is so loud that it goes in your ear and explodes. Too much for your ears to take and your ears go BANG.	Too loud. It's too hard on your eardrums. Your eardrum starts banging like a real drum, and then it breaks and then GONE! Too loud.	You can hurt your eardrums and break the sound. If the noise is too loud it can damage. Noise is vibration, and when it comes in and vibrates your eardrum and if they vibrate too much they can shatter. It explodes 'cause it's going too fast and your ear...falls apart. It shakes apart. It falls apart. Yeah.
KNOWLEDGE *Number 3* **(Pre)** **"What places or activities could damage your hearing?"**	Rock concerts. Airports. Airplanes. Truck drivers. Factories. Tractors. Loud motors. Loud tape recorders. Putting clay in your ears. Q-tips in your ears.	Concerts. Concerts. Fashion shows (with loud ramp music). West Edmonton Mall. sitting by the coach or in Stanley Cup games, you're dead.	A construction site. Power plant. We had to wear earplugs 'cause there's so much machines. A concert. A Metallica concert.
KNOWLEDGE *Number 4* **(Pre)** **"Who do you think should worry about damaging their hearing?"**	Someone in a steel factory. Rock and roll concert players. Michael Jackson. Your own self. Yourself. Everyone.	Everyone. Everyone. Us. All people. It can happen to anyone except the Deaf.	Kids. Babies. Yeah, kids. Everyone. We do. And the Deaf. Older people. Old people. Most old people can't hear. Most old people are deaf.

KNOWLEDGE ***Number 5* (Pre)** **"How do you think you could protect your hearing in noisy situations?"**	Earphones. Wear earplugs. Put on a motorcycle helmet. Being noisy yourself to block out the noise. Not going to noisy places. Ask someone to turn the volume down/to be quiet. Tell a policeman.	Earplugs.	Earplugs. Earplugs. Earphones. Earmuffs. Walk away. Plug your ears. No Q-tips. Don't stick in Q-tips. Don't put anything in your ears smaller than your elbow.
KNOWLEDGE ***Number 6* (Pre)** **"What do you think hearing protection looks like?"**	Earplugs. A plastic ear that covers your ear. An inventor could invent something to protect your ears.	Like earplugs. Foam with a silver thing. Looks like a string. Soft ones that you roll.	
KNOWLEDGE ***Number 7* (Pre)** **"What are some warning signs that you are in a noisy situation?"**	If you can't hear yourself, like under the water when it sounds muffled. If you can't talk too well.	Ringing in your ears. Pain.	When people are talking and you can't talk yourself.
INTENTION ***Number 8* (Pre)** **"Would you wear earplugs to protect your hearing?"**	Yeah. I guess so. If it was really, really loud. I don't wear earplugs because it's embarrassing. They look weird. Well, if a whole bunch of people were wearing earplugs it would be easier. If everyone was. If they had neat colors. I would wear them if I thought it would damage my hearing. I would wear them.		
OPINION ***Number 9* (Pre)** **"Do you think it's important to protect your hearing?"**		Yes. Yes. Yeah. Yes. 'Cause I like music. You might miss something really important if you're deaf, if people don't know you're deaf. You can't hear a fire alarm, or a car from behind. Would be more dangerous riding bikes.	Yes. Yeah. Yes. Yes. Not really. I don't know. If we don't, at an older age we might be able to hear at all. It will be harder in life. If you go to church you have to sit right up at the front. Church, yeah, and that's how you meet people. (The students talk about people in the front row who can barely hear

			the huge loud speakers.) Wow. Very sad.
INTENTION *Number 10* **(Pre) "Would you tell someone else to wear earplugs if the noise was damaging?"**	No. No! I'd be embarrassed. Yes. I wouldn't really care because it's their ears. I wouldn't say they had to wear earplugs, but would maybe talk about it. Maybe if we were in a conversation about hearing, then maybe I would say maybe you should wear them. No. Embarrassed. I don't think they would. You'd look like a goof.		
INTENTION *Number 11* **(Pre) "Do you plan to do anything to protect your hearing in the future?"**	Yes. Yes. No, well maybe I would if I worked at a factory. Yeah. I would. If I was in a place where I KNEW I would damage my hearing then I probably would.	Yeah. Turn my music down low. I like loud music.	Nah. Yeah. No, I don't think so. No. Yeah. Yeah, kind of, maybe. Depends. depends on what I'm supposed to do. If you don't protect your hearing when you are younger and then you go deaf, it will affect your life. Don't expose yourself to loud noise. Be more careful. Try to make other people be quiet during a discussion. Tell other people to be quiet.
INTENTION *Number 12* **(Pre) " If you were at a concert with some friends, and the music was loud enough to damage your hearing, would you do something to protect your hearing?"**	No. Yeah, I would because it's better to be safe than sorry. I don't think so. It would be embarrassing. Maybe if they were really small. it's better to wear earplugs for two hours (at a concert) than to be deaf for the rest of your life.	Yes. Yeah. Yes. Yeah, earplugs.	I probably won't if I'm having fun or something. Well, at a concert I wouldn't walk away, so... I probably wouldn't care too much. Yeah, as long as I'm having fun who cares? No comment. No comment. I could fix it after. Let's go party.
OPINION *Number 13* **(Pre)**	Probably think I'm a total geek. Yeah.	They'd probably think I'm stupid. Dumb.	Weird. Mental. They'd think I was really

"You are at a concert and you put in earplugs. What would your friends think?"	Yeah. If they're friends they won't care. If they call me a geek I'll shove my earplugs in THEIR ears.	Think you're geeky. I'd just leave it. I wouldn't be embarrassed. My friends wouldn't care. You could just cover your ears. Yeah, if it's really loud cover your ears. They won't care. Yeah.	weird because I tried to protect my hearing. You're boring, sick and a geek because you're sitting there with earplugs (is what my friend would think). They'd probably ask me 'How does it feel to be the center of humiliation?' Exactly. It's embarrassing.
OPINION *Number 14* **(Pre) "What would you think if your friend put in earplugs at the concert?"**	Beat 'em up. Geek. I'd feel kinda funny, but I'd also know that it was smart. They should give them out at concerts.	I'd think they were very wise to put them in. I'd say they looked really dumb but wise. I'd ask them for a pair.	I would ask them 'How does it feel to be the center of humiliation?' I'd ask them to split it with me. Yeah. 'Where do you belong? In a rehab center?' 'Excuse me, you're mental.'
INTENTION *Number 15* **(Pre) "You're sitting on a couch at your friend's house watching TV and playing cards. You have to shout to be heard above the TV What would you do?"**	Turn the TV down. Turn down the TV If it was a good show I'd leave it and wouldn't play the game. I'd probably tell them to turn it down, because that wouldn't be embarrassing, 'cause they'd say, 'Oh, you can't hear.' If it was a good show I'd just go downstairs, where I couldn't hear.	Don't watch TV Stop watching TV Turn the TV down or off. Turn it down or off. Yeah, if you had to yell over the noise that's too loud. That's way too loud. It's way too loud, so turn it down or turn it off. It wouldn't be embarrassing. No, it wouldn't be embarrassing.	Turn the TV off to concentrate on the game. Turn the TV down. Turn it down. Shout louder. Speak louder. Go out of the room. Turn it down. I'd turn it off, and in ten minutes turn it back down. I'd probably turn the TV down or stop playing poker.
INTENTION *Number 16* **(Pre) "You're at a car race or a tractor pull with a friend and you have two pairs of earplugs. What would you do?"**	I would share. Throw them at the other people and peg them in the head! If they were not used, I'd offer my friend a pair, but not if they're dirty. I might wear a pair. I'd wear a pair because it's so loud. If I were at a rock concert and put them on, you couldn't hear what was going on	I wear earplugs. I think they recommend you do. I hold my ear like this (push in tragus), I even have to hold my ears. They sold earplugs there. A hockey game is very loud. That's a good place to lose your hearing. Put them in. Put them in. I'd offer the one to my friend. Yeah, I'd put them in	I would never do that anyway. I'd keep them in (my pocket). Put all four of them in. I'd wear them. Even though I'd look like a geek, I'd still wear them. I'd wear one pair and offer the next pair to the (friend). I'd stick my gum in my ear. I'd probably wear them, but I wouldn't give them to

	(but would wear them to a tractor pull). I would wear them but my friends probably wouldn't wear them because they wouldn't know it would damage their ears.	and hide. I'd let them have one. I'd (push in tragus).	him (a stranger) unless he asked for them (would give them to a friend). Yeah.
INTENTION *Number 17* **(Pre) "You're with two friends at a concert and you have one pair of earplugs. What would you do?"**			Put one plug in one ear and a finger in the other and take turns. Let my friend have them and put my fingers in my ears. Just don't sit at the front. I'd offer (the plugs) to a stranger or a friend.
INTENTION *Number 18* **(Pre) "You are somewhere with a loud band playing (e.g. a wedding, a restaurant). What would you do?"**		Die. I'd probably leave or just stay there. Reduce the damping power of earplugs, 'cause if you put an earplug in and can't her, it's bogus. I'd put in earplugs. If I didn't have any (earplugs) I'd just leave. Just cover my ears.	Need earplugs. I'd plug my ears. Plug my ears so my Mom wouldn't give me a lecture. I'd go take a break and rest my ears. I'd probably listen to it because if I had earplugs or my finger in my ears, they'd probably be very offended.
INTENTION *Number 19* **(Pre) "Have you ever been in a noisy situation that could have damaged your hearing? If you were, what did you do then, and would you change what you did now?"**	Yeah. Yeah. Yeah. Yeah. My brother was listening to the stereo too loud, and I asked him to turn it down and he did a little bit. Today I'd take the ghetto (blaster) and throw it out. I was at a rock concert and thought it could damage my hearing, but I was fine. I'd do that again (stay). I was at a rock concert but it didn't hurt. If something hurt my ear I would do something. Yeah. I wouldn't do anything differently.	Plug my ears. Wear earplugs, and now I'd probably get my Dad's special earplugs. I just covered my ears (at a factory), but now I would start to wear earplugs. Even with earplugs it was so loud I could still hear it.	Mmhmmm. Yes. Yeah. Yeah. Yes, I have. This morning people were popping balloons in other people's ears, so I stopped them. Yes. Yeah, I have been, but I didn't do anything. Yes, I have, at the power plant (very noisy) we all wore earplugs. Yes I have been in a noisy situation and there was really nothing I could do about it, so I just left it. At a construction site my Dad told me to put my

			fingers in my ears. Sitting on a couch watching a hockey game I was yelling 'cause they won, and I fainted and plugged my ears. I played in a band.
OPINION *Number 20* **(Pre) "Do you think you or other people in your household are ever exposed to noise that could cause a hearing loss?"**	Yes. Yeah. Yup. Yeah. Yeah. Yeah. Well, I don't know, not really. Yeah.	Yes. Yes. Yeah. Yes. Yes. Yes. Not sure. Not my Mom and Dad. Yeah, my big brother. I think I've lost a little bit of my hearing already, when I was four years old (not due to noise).	Yes. Yes. The vacuum cleaner. No. Maybe. No. Yes. Yes. Of course, yes. Yeah.
OPINION *Number 21* **(Pre) "Do the adults in your household know enough about how to protect their hearing from noise?"**	Yes. Yeah. Yes. No, they don't know, parents are dumb. Yeah, I think my Dad. It's hard to explain. They don't really know much about it, but if they did, they'd probably do something about it. Probably my parents would know 'cause they've been through the stage and my age and they would know more than I would. They do know enough.	Yes. Yes. Yes. Yes. No. Maybe. My Dad yeah. My old dog is deaf, he had cataracts in his ears.	Yes. Definitely not. No. I think so. Yes. I dunno.
OPINION *Number 22* **(Pre) "Do the young people in your household know enough about how to protect their hearing?"**	My brother doesn't know. No. No. Yes. Yeah. No. No. No way. No. No. No. No.	No. No. No. Not my older brother, but my parents yes. Not my two little sisters and my little brother.	No. Definitely not. They do not know anything. They are so stupid. No. My sister keeps her radio on full blast. My two older brothers have their radios and music on all day and all night and you hear it all over the house. My brother sits and listens to music with his ear to the speaker. No. No. My brother does not know anything, so

			how could he know enough to protect his hearing?
OPINION *Number 23* **(Pre) "Do you think the adults in your household are adequately protecting their hearing from noise?"**	No. No. No. They're never in noise. No.	Dad yes. Mom no. Yes. Yeah. Yeah. All except my big brother. Mom=so-so. My parents do.	No. No. Yes. Definitely not.
OPINION *Number 24* **(Pre) "Do you think the young people in your household are adequately protecting their hearing from noise?"**	No. No. No. No. My brother is. No.	My brothers no, me about half the time. I'm O.K. My sister does not care. I sort of care.	No. No. NO! No way, no. For sure not. My brother is so stupid.
OPINION *Number 25* **(Pre) "Some students from the other schools said in the questionnaire that things like snowmobiling, hunting and loud music couldn't hurt their hearing. Why do you think they said that?"**	'Cause they are dumb. 'Cause they're dumb. I've been in lots of those situations and didn't lose my hearing, and maybe they've (also) been in those situations and found they didn't lose their hearing (either).	Snowmobiling doesn't hurt because you have to wear helmets. Loud music is just too loud. Probably because they like it. Probably because they like loud music and don't want to turn it down. They're used to loud music. They probably just don't know, and are fooling around. They're crazy.	"Cause they're weird. They don't have a brain. They like their music loud. They don't think they'll hurt their hearing. They don't know that because education in public schools is really nothing, because I went to public school. Maybe loud music, but snowmobiling and hunting won't hurt your hearing, because with hunting you always have those earmuffs, and snowmobiles have mufflers. I can see their point. If you're at a concert you can't turn it down. Who said I'm at a concert? If you're snowmobiling and you don't have anything with you...neither have I (worn hearing protection for snowmobiling) except

			sometimes if you're around a lot of people then it can hurt your ears -- I'm not saying it does all the time, but some of the time. It hurts my ears. My Dad hunts, and he doesn't have a hearing problem, so... I do (have a hearing problem).
OPINION *Number 26* **(Pre)** **"Some students said in the questionnaire that some members of their household didn't adequately protect their hearing. Why do you think they said that?"**			Because they don't protect their hearing. I said that because usually our family is not exposed to loud noise, so why should they have to protect their ears? Well, my family doesn't, but I don't think they know enough about hearing. They need to protect their hearing, because if they don't, they will get hearing problems and be very sad 'cause the kids will have to learn sign language.
OPINION *Number 27* **(Pre)** **"Do you care if you damage your hearing?"**	Yes. Yes. No. No. No. Yes. Yes. I care because I'm a citizen of Alberta, I don't want to be deaf, I like hearing. I don't want to be deaf, 'cause I want to listen. I care. I care.	Yes. Yes. Yes. Yes. 'Cause then you go deaf! You wouldn't hear anything. You wouldn't hear anything.	Yeah. Yes. Yes, I do. You can't sing if you can't hear.
OPINION *Number 28* **(Pre)** **"What would it take to convince you to wear hearing protection?"**	Put a gun to their head. If someone forced you. Maybe if you would die from it. If something really bad would happen. You'd convince me if one of my favorite stars like Michael Jackson became deaf and I knew it was true.	That I'd never be able to hear anything again. I've already lost some, so I don't want to lose more. I think you should tryout earplugs for a day and see how you like it.	If someone that was a real good friend or if I thought I should. Make someone go deaf. If someone lost hearing who was a friend. If no one loses their hearing, I wouldn't really care, but if someone does, I will care. If you said

			maybe 20 million people in Canada, O.K. maybe 2 million people in Canada lost their hearing, maybe I would think about that. But in America they're so stupid they don't even know the difference! Show me a story about hearing loss -- that would be a good way. Yeah, a story. Like, 'Here's a person, here's a gunshot, BAM, he's deaf. It would take a chocolate bar, a story... Three trips to the water park, money... A cheeseburger. A movie star.
OPINION ***Number 29*** **(Pre)** **"The vice principal of your school has asked me to get a committee together to develop a program for your school about hearing protection. You are my committee. What do you think is important to tell the students?"**	I would tell them that if you don't wear hearing things you wouldn't get to enjoy life as much as you would if you did. Wear them (earplugs). I don't know.	I can't say. Mainly that everything that's loud can damage your hearing -- TV If you don't do anything to protect your hearing, you'll damage your hearing and go deaf. A commercial. You don't get a second chance if you lose your hearing. Hearing is a part of your life (that would be lost). You've only got one chance. Yeah. That sound tester is too expensive. (Library should have one?) = Good idea. If it (sound level meter) was ten dollars, then lots of people would buy it.	I think we should do this now because a lot of people are losing their hearing nowadays like my Grandpa, he can barely hear anything. Take them (students) out to live music and see a movie. you can have a story of a person who lost their hearing for certain reasons, and then they demonstrated to their families how to protect their hearing. Plays! I would tell them how people lose their hearing and how people protect their hearing. But we're not gonna have them sit there bored. Take them to a rock concert so it affects their ears and then test their ears

			and take it back and show them. And then half of them are deaf ?!?!? Play (loud) classical music over the intercom because they won't like how loud it is and they'll get mad and we'll tell them this is when you listen to your normal music, the only reason you stand it is because you like the music. We should demonstrate loud music, should have volunteers. How you can protect your hearing. We can have some earplugs and put them in their ears and ask 'Can you hear this?'
OPINION *Number 30* **(Pre) "Would you tell adults anything different than the students?"**	The same. Same. Different. Different questions.	No. No. No. Well, no. It would change a little, like bigger words. Just because they're older doesn't mean they're different than us (Yeah. Yeah.) and can't lose their hearing. Yes! They tell us to turn down the music so we should tell them to wear earplugs as well. It's just as easy for them to lose their hearing as everyone else.	No, it might just be different information because they might get kind of bored. (But would tell them the same things).
OPINION *Number 31* **(Pre) "In 1993, today, with all the other things to worry about in the world, how important is it for you to protect your hearing?"**	Equally important. Don't know. Less important than some other things. More important. I don't know, some things are more important than hearing loss. Yes and no, it's both ways.	A lot. Very a lot. Very. This is important, with all that technology. This guy went crazy and then deaf and they fired him! Just as important. Yeah. It's all important.	Yes. Yes, it is. Very, very important. Definitely important. Nah! But you can live without your hearing. I would like to be deaf. Beethoven was deaf. Yeah, what's one person's ears

		Important. They should take all the new radios and make them so that they can't go over 100dB. Just as important as wearing sunscreen.	compared to all the world's constitutional crises? I would (want to be deaf) if it meant the rain forest wouldn't be taken down. She has a point. 'Cause you're going to be living for 80 years, and the rain forest is going to be living for...uncountable. And abortion --what's better, life or ears? (Ears are still important, but) there's more important things. We're talking about the world here. But your ears could affect the whole world. That could affect the whole world.
OPINION *Number 32* **(Pre)** **"With all the other things to worry about in the world today, is it practical for me to expect young people to protect their hearing?"**	No. Yeah. Yeah. Expect, no, but hope, yes. Yeah. Yeah. Yeah. Yeah, sort of. Yeah. It's not ridiculous. I think you're concerned about our hearing. Yeah. Yeah. Maybe we would.	Yeah. Yeah. Yes. Yes. No.	A lot of people don't consider what adults say. Kids don't think anything is going to happen, but...
INTENTION *Number 33* **(Pre)** **"Two boys lost their hearing ... If you were a teacher, what would you want to say to your students so that it didn't happen to them?"**	Wear earplugs to be on the safe side. If you want to hear well the rest of your life then wear them, but I can't force you. If you want to play walkmans that loud then wear them around your neck. I wouldn't give them any advice, because I'd just be going on advice and I wouldn't do it either. (If I became a government leader I'd) make a law	Keep careful of what you're doing. Keep yourself aware. If you get an earache, stop listening to it. Don't listen to your walkman at level 9, but only at level 3. Control how loud the speaker is. Be careful: if the walkman is attached to your belt and you (accidentally) bump the volume up, it can blast your ears.	O.K., don't listen to your walkman so much. If you're going to crack firecrackers, step away. Yeah, you have to be at least 10 feet away from it. And the walkman, you don't have to listen to it full blast.

	that you can't have firecrackers. Turn down your walkman.		
OPINION ***Number 34* (Pre)** **"Is there anything else you'd like to say about this topic?"**	Can walkmans hurt your hearing if it's that loud? What about snoring? What do you think about hearing loss? Have you been to more schools? Are you coming back? This is fun! Come tomorrow and Friday. I think it should be a law that if it's really loud you should wear earplugs, and they should sell them in more stores. I've never seen them in a store. My Dad works for the city and they force him to wear earplugs, 'cause he's a mechanic. Aren't there laws already?	Can they fix (when middle ear bones don't vibrate)? If you pierced your ear up on your earlobe, would that hurt your hearing? They should give out earplugs at the door to concerts and say 'Wear these or don't go in.' They should make you wear them. No, not a law, but they should encourage you to wear earplugs because you could lose your hearing. A lot of people wouldn't like to (wear earplugs) though.	If I was a teacher I'd bring up those people (who lost their hearing) and like talking about them for a while because if you just say 'Don't listen to your walkman' right, they're probably not gonna listen to you, unless you bring up people who have had that happen to them.

APPENDIX G: POST-VIDEO INTERVIEW TRANSCRIPT SUMMARY

TABLE 6

	Meadowlark - Group 1 answers	*Meadowlark - Group 2 answers*	*Millwoods - Group 3 answers*
KNOWLEDGE *Number 1* **(Post) "What places and/or activities do you think could be damaging to your hearing?"**	Rock concert. Boom box. Swimming and getting water in your ears.	Concerts. Concerts and loud things.	Concerts and loud noises.
KNOWLEDGE *Number 2* **(Post) "What do you think a hearing loss from noise means?"**		It means noise goes in the ears to those bones, and then they don't vibrate and you can't hear anything.	
KNOWLEDGE *Number 3* **(Post) "How could you protect your hearing in noisy situations?"**	Wear ear protection. Wear earplugs.	Earplugs. Earplugs. Or turn the music down.	Earplugs. Earplugs.
KNOWLEDGE *Number 4* **(Post) "What are some warning signs that you are in a place that is too noisy?"**	Your ears hurting. Can't hear. Ears are pounding, ears are bleeding. If everything's muffled.	Pain. Pain. Ringing. When it (sound) is soft. If you have a hearing loss, things are softer.	Pain. Ringing in your ears.
INTENTION *Number 5* **(Post) "Do you plan to do anything to protect your hearing in noisy situations?"**	Yeah. Only if I have to. If you're at a concert. Maybe. Probably. Probably not. Not when I'm sleeping or go out in public. I wouldn't wear them anyways (even if others were) because it would look funny. They bother me. I've never tried them.	Yeah, sure. Wear earplugs. Try not to stay in those kind of areas for very long, like stay only as long as you absolutely have to. Know 100% about what to do, like us.	Not really. Yes. Same as before (the video). Well, maybe a little bit more. I don't think the video changed me that much. 'cause it tells you 'What are these things,' not 'What it will do.' He tells you 'These are very annoying,' not what the consequences are. He (video) didn't tell us how to protect our hearing. He said loud noises are bad because they are annoying and something can happen (if you don't protect your hearing), but not

			exactly what will happen or how to prevent. Not consequences. He just gave a generalized opinion. Now I know noise can be damaging, but I don't know if I'm gonna go to the extreme of wearing earplugs all of my life. Most of us already know the basic stuff that he said. It wasn't informative. We need more information.
OPINION *Number 6* **(Post) "What would you think if other people put in earplugs at a concert?"**	Weird. That they were the weirdest people. I'd think they were SMART. Yeah. Yeah, weird but smart. Yeah.	I'd think it's weird. I might ask them if I could use them, if I didn't have my own pair. It would be dirty to share. Only share if they had a couple of pairs. Yeah.	(Feel the same way?" Yeah. Yup. Well, the concerts I go to aren't that loud. Yeah. This one was bad, but it didn't bother me. We went to a movie and sat right at the front (in front of the speakers) and it kinda hurt or ears at first, but we slowly got used to it, so...we wanted it louder. Yeah. Yeah, that's true. Does it still wreck your ears? Becomes a habit.
INTENTION *Number 7* **(Post) "What would you do if you were at a place with a really loud band?"**		Plug my ears. Earplugs. If I planned to go someplace I'd know it would be loud so I'd avoid it. I wouldn't go to a band if I didn't know what they played. Me, too.	
OPINION *Number 8* **(Post) "Would you want to be like (people who put in earplugs at concerts)? Would you want people to think you're weird but**	No. No! Definitely not. Yeah, people already think I'm weird and smart. Well, not smart. (Still be embarrassed?) Yeah. Yeah. Yeah, I would.		

smart?"			
OPINION ***Number 9*** **(Post)** **"Do you think people in your household are ever exposed to noise that could cause a hearing loss?"**	Yeah. Yeah. No. My brother has his music full blast, so I can hear my brother's walkman. I blast the music. Same here, it was pretty loud.	No. Sometimes, yes. My sister, she listens to loud music. Yes. Yes, my sister. Yes. My Dad. My Dad (work related). My Dad has a hearing loss (NIHL).	
OPINION ***Number 10*** **(Post)** **"Do the adults in your household know enough about how to protect their hearing from noise?"**	Yeah. Yeah.	Yes. No. Yes. Yes. Maybe. My Dad yeah. My Mom does. My Dad does, but he learned the hard way. My Mom knows some but not all.	
OPINION ***Number 11*** **(Post)** **"Do the young people in your household know enough about how to protect their hearing from noise?"**	No. No. Some people are. The really smart ones. Yes, US! (Brothers and sisters?) No. No, they don't think much so they don't. Definitely not my brother.	No, no, no! No. Not at all. My elder brother might.	
OPINION ***Number 12*** **(Post)** **"Do you think the people in your household are adequately protecting their hearing from noise?"**	Yes (they don't listen to loud music). No.	Yeah. Yeah, my Dad is. Kinda. My parents yes, because they know about it. My sister no. My Mom tells her to turn down the music. My Mom and me both (yes). My Mom is just around the house, and my Dad always wears hearing protection.	
OPINION ***Number 13*** **(Post)** **"Do you care if you damage your hearing?"**	Yes. Yeah. Yeah. Well, I don't care about preventing it, but if I do hurt my hearing (I'll care), but not before. I just don't think of it. I have a lot to care about and stuff. (2 only care if they damage their hearing). I care. But I still care about protecting. Yeah, better safe than sorry. I don't want to lose it forever. You	Yes. Yes. Yes. Yes. Yes. I like to hear.	

	don't want to lose it forever. And then you won't be able to hear again.		
OPINION *Number 14* **(Post) "What would it take to convince you to wear hearing protection?"**	I don't know. Have to be forced. If they said something that said you'd go deaf. If someone came up and said 'Wear earplugs or die.'	Nothing really. (Are you convinced already?) Yeah. Yeah. Yeah. I need to know what makes it get worse.	
OPINION *Number 15* **(Post) "The vice principal of your school has asked me to get a committee together to develop a program for your school about hearing protection. You are my committee. What do you think is important to tell the students/include in the program?"**	Ask questions and makes them pick the correct answer for the question. Make it fun. You get money for correctly answering questions. Yeah, like how many ears does it take to get...or something. (Jokes?) Yeah. Yeah. I would make a motion picture or something. Yeah, have someone else driving his car, and he can't hear something, and he gets crashed up and killed. Yeah. You could put one on a Nintendo game, like people, like here is the ear and you have to jump up and get it. You could get a little bad guy and you could be a little infection and you have to get a big ear, or maybe you could be an ear and you have to get an infection... Yeah. (Should be really fun?) Yeah. Yeah. Sometimes programs (on TV) are so boring you can't even listen. Maybe a skit or something. Yeah. Or like maybe a skit that	Free earplugs as a sample. Or you can get sound testers and we can just borrow it. Teach about things that may be harmful. Hand out things that could be related to hearing. Different question things. They should get two periods out of Social. A video like that, but different.	Envelopes, earplugs. And in the envelopes a big noise that says 'Don't get deaf!' and 'Be Cool,' maybe put free stuff, like free stickers, and maybe $2.00 off coupons or eardrops. (Free hearing tests?) Yes. I know a way to get lots of people to come to this program: you could say 'Either you have Math class or you can come in here,' a choice, and more people would go to the program. Like Academic Challenge (AC: you have the choice to go or not), only twice a week or something. If it's every day, you'll miss out on some school. (Don't want to be forced to go). If you're forced it's like Communists. They tell you what to do, when to do it and how to do it. Immediately!

	could be really funny. It's fun when you get to like act things out and also get the movie (video) to be like action-packed. Also, you could have a cartoon character.		
OPINION *Number 16* **(Post)** **"In 1993, today, with all the other things to worry about in the world, how important is it for you to protect your hearing? ___ is more important than my ears right now."**	My girlfriend. Yeah, my girlfriend. My girlfriend and exams, studying. (If it was a common thing and everyone was wearing them already I would. If they were damaged a bit already I would start protecting them.)	Nothing. Eyes are more important. It's more important now than yesterday. Yeah.	
OPINION *Number 17* **(Post)** **"What did you think about the video?"**	(Laughing) Boring. Boring. Kind of weird. It was kind of dumb. I think they have to get with the age. Yeah. This film was too juvenile. Yeah. Boring. It was sort of weird., I dunno. it was just weird, I dunno. I mean, RAP!? Yeah! That's the kind of thing you see every day.	Kind of corny. That guy was scary. I'd like more illustrations. Yeah. Like your ear and everything. Your ear, what gets hurt, up close.	Boring. Cool. I liked the pictures of people doing loud things. I learned a lot. That rapper wasn't suited to the video. He messed up words at the end. It's more for younger kids and better when people liked rapping. Maybe for younger kids. I learned the basics, like ears, inner, outer, yeah. I like rock and roll. We still think the same about NIHL (didn't change opinions). Uhh, it could've brought the message to people a little younger than us, but...(not for our age). No comment.
OPINION *Number 18* **(Post)** **"If people are making a new video now, what would you like to see?"**	See someone whose ear popped out and he said 'Aah, I can't hear!' And the ear would say 'Hi, I'm Mr. Ear.' Gore! Yeah, right. If I were to see a movie, I'd like it to be kind of	More stuff like what else could cause it, or where you can buy earplugs.	Instead of lecturing about hearing and not hearing, they should have made it a cartoon. It would have been more interesting (with a cartoon). They need a new character (not the RAP kid).

	interesting. Something that would catch my interest. It would be cool to see the inside of the ear.		But then everyone would complain that they wanted it REAL (not cartoon). Then combine them. Like Roger Rabbit. Yeah. That would be neat. Like Mac and Me. It would be cool to have a cartoon ear. Have someone losing hearing. A cartoon idea. (Possible character = Christian Slater, a musician) A cartoon with one like Bugs Bunny or Roger Rabbit. Christian Slater. He's a babe. Or that girl Jennifer (from Roger Rabbit). Country music instead of rap. Yeah, country. Or Pop. I like Pop too. Brian Adams!
OPINION *Number 19* **(Post) "What DON'T you want in the new video?"**	That guy! People talking just like it was a report, on TV reports. Yeah. Yeah, all they do is sit there TALKING. Boom box is a dumb name. No pictures or anything.		No rap!
OPINION *Number 20* **(Post) "How do I convince people that it is important to protect their hearing?"**		Scare them, for example 'If you don't protect your hearing, you'll never hear.' Put warning signs on walkmans. Make it (protection) popular before it becomes a habit. Show them the video (educate). More information would change their minds, ('cause I changed my mind). Yeah. Yeah.	Expose them to noise. Expose them to loud noise, and then say 'Can you hear?' Keep going until they lose hearing. Give them temporary deafness. That scares people pretty good. How can you do that?
OPINION *Number 21* **(Post) "In general, how do**	It's O.K. Yeah. It can be interesting if you want. But at times	Boring. Interesting. I dunno.	It's all right, but don't have any lectures, especially Mr. T__,

you feel about this topic?"	that movie was so boring. Yeah. It can be boring but it's good to know about it. Yeah, to protect yourself. I think it's interesting. I just think it's interesting 'cause it's interesting.		'O.K., listen up!' (Should be fun?) Yeah. Yes.
OPINION *Number 22* **(Post) "Were these discussions helpful to you?"**	A little bit. Sure. Yeah, because we can learn more to protect our ears. Yeah. Lots of loud things don't hurt your ears, so it's important to know.	Yes. Yeah. Yes. Because now we know what can be harmful to our ears, and before I would have used the blender everyday, and I wouldn't know that I was losing my hearing, but now I have the information I need. I'll be more careful around blenders. No, because I already hate loud noises. I turn it right down. I think we know what to do.	Yeah. Yeah. Yes, I thought it was fun.
OPINION *Number 23* **(Post) "Do you want to learn more about this topic? What?"**	No. No. Yes. Yeah, a little, I guess. (If the program was not during and in school?) No. No. Maybe a little bit. Maybe a little bit. Maybe a lot. If it was a good movie I would. Same here. No lecture, forget it, no way.	Yes. What and how much noise can damage. Like if I listen to loud music, that doesn't mean I'll lose it forever. You can't think you can't listen to anything loud, because you're scared you'll lose your hearing. Well, I'd like to learn more about the topic.	About dBs. How loud is too loud? Maximum loud sound. Yeah. No, not really. Well maybe a bit, but... It's O.K., but... What's an audiologist -- a doctor?
OPINION *Number 24* **(Post) "What information should have been included?"**			Consequences. Consequences. Consequences. Like what a dB is. Yeah, like a whisper is 60dB and a plane is 140dB... He's just giving us stupid information. He's not telling us what it will do. Or what extreme. Yeah,

			if he's lecturing against boom boxes, how come in the beginning he's carrying one right against his ear?
OPINION ***Number 25* (Post)** **"Misc. Suggestions"**		(Don't want to have to do any of the research for answers themselves) Do a really funny ear commercial, not like that dumb drug commercial. My best friend's sister hates it. Everyone hates it. Put on something fun, not serious. Catchy. Yeah, catchy and funny. Not too funny, because people will just laugh, but not so boring that people just sit there. Like the Listerine commercial. I like it. It gets the point across. Put it on TV because people watch day after day after day. A commercial, not a program. Programs get boring. If I saw a program on hearing, yuck. Yeah, I'd turn it. A short commercial, funny. One that gets ya. One like where everyone thought the old lady got hurt, but it was the young lady. It was catchy. yeah. It got me. It should be funny. Like draw an ear with a head, or a guy with huge ears. Make it a cartoon. a 'This could happen to you' theme.	